

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF SOUTH CAROLINA
CHARLESTON DIVISION

SOUTH CAROLINA ELECTRIC & GAS : VOLUME II
COMPANY :
 :
vs. :
 :
UGI UTILITIES, INC. : 2:06 CV 2627

Trial in the above-captioned matter held on
Tuesday, March 17, 2009, commencing at 10:05 a.m., before
the Hon. C. Weston Houck, in Courtroom IV, United States
Courthouse, 85 Broad Street, Charleston, South Carolina.

APPEARANCES:

BRUCE FELMLY, ESQ., BARRY NEEDLEMAN, ESQ., and
CATHRYN E. VAUGHN, ESQ., P.O. Box 326,
Manchester, NH, appeared for plaintiff.

ELIZABETH PARTLOW, ESQ., 1320 Main Street,
Columbia, SC, appeared for plaintiff.

JAY N. VARON, ESQ., 3000 K Street NW,
Washington, DC, appeared for defendant.

PAUL BARGREN, ESQ., 777 E. Wisconsin Ave.,
Milwaukee, WI, appeared for defendant.

R. SCOTT WALLINGER, JR., ESQ., P.O. Box 12487,
Columbia, SC, appeared for defendant.

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I N D E X

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1 THE COURT: I believe you were on the stand.

2 MR. FELMLY: Your Honor, there is two brief
3 housekeeping matters, if I could just address them for just a
4 moment.

5 Last night Mr. Bargren and I did go over those exhibits
6 that I had offered at the end of the day, and I've coordinated
7 with the clerk on those. And there is one of the exhibits,
8 and it's the first one of several that we've had, the parties
9 entered into a stipulation that they could be marked as a full
10 exhibit, but they are summary exhibits that have various
11 tables and things and we agreed that characterizations of
12 counsel on those would not be conceding the accuracy or the
13 raising of it.

14 So as to all of the exhibits that I've given the clerk
15 this morning, other than Exhibit 78, they are unaffected by
16 that stipulation. Exhibit 78 is the first of the
17 demonstrative or composite exhibits that are subject to the
18 parties' stipulation that are set forth in our objections.
19 And essentially it says that the cover materials, the
20 descriptions, the things that experts may have labeled,
21 various things for clarity which may be of aid to the Court,
22 that the parties are not waiving the ability to contest the
23 description of those clarifying points, essentially the work
24 product that's on them. We came to that agreement so we would
25 have the ability to present you summary sheets and things that

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1 I think will be of assistance.

2 So 78 is --

3 THE COURT: I'm not sure I understand. You mean the
4 attorneys have made some notations in the margins or
5 something?

6 MR. FELMLY: It's two different things. Not so much
7 that, Your Honor. Some of these exhibits, for example, on
8 minutes of the board, there are packets that may have 40 or 50
9 of those that are representative samples. There is -- each
10 side has presented a summary sheet pursuant to the rule, that
11 sort of indexes it by date and indications, and then there is
12 a brief description of what it is. That's one type of
13 document.

14 The other type of document is that some of the maps and
15 some of the plans that we have which have been labeled by
16 experts to show various things and have added materials to
17 those plans, what the stipulation says is that the parties
18 have agreed that --

19 MR. BARGREN: Why don't we just read the language of
20 the stipulation?

21 MR. FELMLY: The parties have jointly agreed that
22 this exhibit can be marked as a full exhibit, reflecting a
23 summary or abstract of expected testimony to be offered by
24 listed witnesses. The parties do not necessarily accept or
25 concede, and, in fact, generally contest the accuracy or

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1 relevance of the characterizations contained in the exhibit,
2 but have agreed to their admission as possible assistance to
3 the Court in presenting complicated and detailed materials
4 during the testimony of the witness, so long as each party
5 does not waive, and, in fact, preserves its right to argue
6 that any such exhibit inaccurately represents or characterizes
7 the underlying evidence, testimony, facts or trial exhibits
8 actually received.

9 That's for the summary --

10 THE COURT: You see, what you're doing is you're
11 stipulating these exhibits are coming into evidence, and
12 you're stipulating that you don't agree that they accurately
13 reflect the information contained therein, which puts me in a
14 position of not knowing what you contest and what you don't
15 contest.

16 MR. FELMLY: No, actually not.

17 THE COURT: Well, so here's the way we're going to do
18 it. If there is something in these documents that the
19 stipulation you've read to me causes one or both of you to
20 question those documents, then you're going to have to
21 question them on this record and bring that questioning to my
22 attention. Otherwise, I'm going to throw your stipulation out
23 and assume that all of these documents speak for themselves.
24 Otherwise, I'm standing on a rug and both of you have the rug
25 by the end and you can pull it out from under me any time you

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1 want to.

2 Do you understand what I'm saying?

3 MR. FELMLY: I do understand, but --

4 THE COURT: I'm not trying to be difficult, you've
5 just got to put up or shut up. If you object to them, tell me
6 what your objection is. If you don't, I'm going to assume you
7 have no objection, in spite of the stipulation.

8 MR. FELMLY: That's fine. I need to explain one
9 other thing.

10 THE COURT: Yeah.

11 MR. FELMLY: The documents, the underlying historic
12 documents are not the issue at all, and if I -- May I approach
13 bench, Your Honor?

14 THE COURT: Yeah, sure.

15 MR. FELMLY: This, for example, is Plaintiff's
16 Exhibit 158. It is a composite of a very large number of
17 historic documents on waste handling. All of those documents
18 nobody has any objection to, because they are historic
19 records, so all these.

20 The thing we're talking about is for your assistance,
21 rather than giving you a folder with a bunch of documents that
22 don't have any organization or outline, each side has
23 presented essentially a cover sheet, a summary that identifies
24 the Bates number, the date, and a very brief description of
25 what the subject of it is. And the only thing we're saying is

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1 that the lawyers' characterizations about this are -- there's
2 no problem with this, but the issue is, I suppose you could
3 say those will be thrown out. We thought they would be of
4 assistance to the Court.

5 THE COURT: I think they would, provided I know which
6 ones are true and which ones are not.

7 MR. FELMLY: Well, the issue will be things like
8 every time somebody says these evidence control, somebody is
9 going to complain. So we felt this would be the way to
10 present it. There are also --

11 THE COURT: That's fine with me, I just want the
12 record to be clear what you're objecting to. I don't want a
13 stipulation in this record that permits you to undermine
14 certain evidence that I might rely on, and then when you get
15 to the Fourth Circuit you decide to bring it to somebody's
16 attention that you object to that. If you're going to object
17 to it, take issue with it, I expect you to do it in this
18 Court, whether by argument or whatever.

19 Is that clear? Am I way off base?

20 MR. VARON: I think it is clear, Your Honor, but it's
21 going to mean, as I tried to indicate --

22 THE COURT: Say what?

23 MR. VARON: I'm sorry, excuse me. I think what it's
24 going to mean is that we're going to spend a lot of time going
25 entry by entry and saying this characterization isn't born out

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1 by the underlying documents. And we're going to do that on
2 cross, and I believe that many of the plaintiff's exhibits,
3 the characterization isn't supported by the underlying
4 documents. Mr. Felmly may believe that some of our summary
5 exhibits are the same way. We were just trying to say that --

6 THE COURT: Well, I appreciate your efforts, but by
7 the same token, I want to know what's in the record and what's
8 not in the record. And if something is erroneous and it
9 doesn't reflect what's in the documents, then I would like to
10 note on that particular notation that there is a contest and
11 that you contend such and such, as opposed to what the
12 plaintiff contends, then I can look at that document closer
13 than the other documents and see which one of you is right.
14 At least that's the way it seems to me.

15 MR. VARON: Understood, Your Honor.

16 THE COURT: But I don't think it's going to be any
17 problem, I just think we need to lay the cards on the table
18 and see, you know, what you agree to and what you don't agree
19 to.

20 MR. VARON: Okay.

21 MR. FELMLY: I'm not sure where that leaves
22 Exhibit 78. We're offering Exhibit 78, and have no objection
23 to, on cross, them going into the items that they want to
24 contest, but we offer Exhibit 78.

25 THE COURT: Well, it would be very simple to, with

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1 the notations that you've made, summarize the documents to
2 include both sides, and say the plaintiff says this and
3 defendant says this. Then I know what the disagreement is by
4 looking at what you've got written there. That would be a
5 very simple way of doing it, and certainly it would be a clear
6 path for me to follow.

7 MR. FELMLY: Some of these though, some of these
8 composites have scores and hundreds of exhibits. It will take
9 us -- the purpose for doing it this way is we could not figure
10 out any way to present this in a way that would combine this
11 for you that would cut us down to a matter of a few weeks
12 rather than a very long period of time, and maybe we've just
13 got to get smarter at it.

14 THE COURT: I don't know that you have, I just want
15 to make myself clear. Let's move on.

16 MR. BARGREN: Thank you, Your Honor.

17 BY MR. BARGREN:

18 Q. Mr. Effinger, good morning.

19 A. Good morning.

20 Q. The parking garage that was built is a project that SCE&G
21 actually constructed, correct?

22 A. Yes, sir.

23 Q. Or arranged for the construction through a contractor.

24 And then the City is reimbursing SCE&G for those construction
25 costs, correct?

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1 A. I believe that's part of the agreement, yes.

2 Q. Yes. And you're not claiming those garage construction
3 costs in this recovery, correct?

4 A. No, sir.

5 Q. And then we move on to -- oh, I just want to make clear,
6 too, that the work that the City did began in the mid 90s,
7 correct? I'm talking now, for example, about the Calhoun
8 Street sewer project.

9 A. Maybe even before that. Late 80s.

10 Q. And we talked a little bit about buses and so on. And I
11 want to show you Defendant's Exhibit 108.

12 MR. BARGREN: May I, Your Honor?

13 THE COURT: Certainly.

14 BY MR. BARGREN:

15 Q. And we'll call that up on the screen. And just taking a
16 look at the heading on this document, can you identify this
17 document?

18 A. This is an internal newsletter.

19 Q. This is sent by SCE&G to employees?

20 A. Yes, sir, I believe that's correct.

21 Q. Okay. And this describes, as it says in the headline, a
22 new service partnership between SCE&G, City of Charleston,
23 correct?

24 A. Correct.

25 Q. And it includes the gas and electric franchise, the first

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1 item there. And it includes some cooperation to underground
2 service, correct?

3 A. Yes.

4 Q. Putting wires underground. And then it includes
5 environmental settlement to support waterfront development.
6 Correct?

7 A. Yes.

8 Q. And then finally it includes regional transportation
9 system, and that would be the transfer of the bus franchise to
10 the City, correct?

11 A. Yes.

12 Q. Okay. So we talked yesterday about --

13 THE COURT: What are the terms of the electric and
14 gas franchise? How do they pay the City? Do you know?

15 MR. BARGREN: I do. They --

16 THE COURT: Is it so much per kilowatt?

17 MR. BARGREN: I believe so. It's in that agreement
18 that was introduced yesterday, it's I think so much per
19 kilowatt, and I think there's a flat fee involved, too, it's
20 included in an ordinance.

21 A. There was an upfront fee of \$25 million, I believe, for
22 that.

23 BY MR. BARGREN:

24 Q. So yesterday we talked, just to wrap up kind of here on
25 the City project and the \$26 million issue, we talked about

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1 NCP issues, we talked about whether there was an order or not.
2 And so with all of that, the \$26 million payment doesn't come
3 under the NCP, does it, Mr. Effinger?

4 A. I'm not sure I agree with that.

5 Q. Do you disagree with that?

6 A. Yes, sir.

7 THE COURT: Doesn't come under what now?

8 MR. BARGREN: Under the NCP.

9 THE COURT: What is the NCP?

10 MR. BARGREN: National Contingency Plan. That's the
11 set of regulations.

12 BY MR. BARGREN:

13 Q. Do you remember I asked you about that at your deposition?

14 A. Yes, sir, the reason I say that --

15 Q. Well, can I --

16 THE COURT: No, let him explain.

17 MR. BARGREN: Okay.

18 A. The reason I'm saying that is that the area that they were
19 working on was all part of the superfund site as shown in that
20 original map that was laid out before this Court. And I
21 know -- I do recall that there were interagency meetings, I do
22 recall that EPA was involved in overseeing that project and
23 providing some approvals of the measures. And I also recalled
24 that there were public meetings discussing the work that they
25 were going to do.

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1 Q. Well, we talked about this at your deposition, correct? I
2 took your deposition in May of 2008; do you remember that?

3 A. Yes, sir.

4 Q. I asked you this question.

5 MR. BARGREN: I'd like to play the video clip, if
6 that's okay, Your Honor.

7 (Video deposition testimony was played as follows:)

8 Q. "Does the general environmental cost that's reflected on
9 these various items on your spread sheet, do think any of
10 those items include work that was related to the parking
11 garage site --"

12 (Video stopped.)

13 MR. BARGREN: I'm sorry, I think this is the wrong
14 clip. I'm looking for page 200, line nine. Thirteen. I'm
15 sorry.

16 (Video deposition testimony was played as follows:)

17 Q. "What about the payment to the City of \$26 million? Does
18 that come under the NCP?

19 A. That's a tricky question. I'd prefer to leave that to the
20 experts, Dr. Shrifrin or someone else on that one."

21 (Video stopped.)

22 MR. BARGREN: Thank you.

23 BY MR. BARGREN:

24 Q. I want to talk a little bit about work in the future. We
25 talked -- you described some of this yesterday at your

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1 testimony. And in your deposition. There was an issue about
2 arsenic, correct? Potentially having to deal with some
3 arsenic contamination?

4 A. For our site? Yes, sir.

5 Q. Yes. And that's been taken care of, correct?

6 A. We're not exactly sure. We had to write a tech memo about
7 that recently. I think it's a closed issue, but we haven't
8 gotten a response letter back from the agencies yet on that
9 technical memo.

10 Q. Okay. Mr. Zeller, at his deposition last week which you
11 attended, indicated that arsenic was probably going to be off
12 the table, so to speak, correct?

13 A. Yes, but we have not gotten any correspondence back from
14 EPA or the State saying that it is off the table.

15 Q. Okay. And as to vapor intrusion, which was discussed in
16 Plaintiff's Exhibit 16, let me show you that.

17 A. Thank you.

18 Q. If you turn to page 21 of that exhibit, conclusion. Or
19 I'll bring it up on the screen, either way, Mr. Effinger.

20 This is the report prepared by your experts to deal with
21 vapor intrusion, correct?

22 A. Yes, sir.

23 Q. I believe you said it went in to the EPA just last month?

24 A. Yes, sir, that's correct. February of 2009.

25 Q. Okay. So SCE&G's consultant's conclusion here is in the

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1 last sentence; therefore, no further action is required with
2 respect to vapor intrusion at this site. Correct?

3 A. Yes, sir, that's their conclusion, but since this is a
4 draft, that's what we're submitting to the agencies. We're
5 not sure that they'll accept that or accept our analysis that
6 it's in this document.

7 The other thing that's potentially for their consideration
8 is whether or not one times ten to the minus fourth is
9 acceptable. Sometimes they prefer a one times ten to the
10 minus six risk, and that would be for cancer frequency. One
11 times ten to the sixth means one incident within a million
12 people. Sometimes they'll accept one in 10,000, but we're not
13 sure of that. We have not gotten a response back on this
14 document yet.

15 Q. But even though this is a draft, you and your consultants
16 have been working on this for at least several months, I
17 believe.

18 A. Absolutely.

19 Q. And you've been in contact with Mr. Zeller from the EPA
20 during that time, correct?

21 A. But he has not reviewed this document yet.

22 Q. But he's aware of your conclusions.

23 A. He is aware of the conclusions, yes, sir.

24 Q. He didn't say no, that's not going to work, you need to
25 come up with something else; he's on board with this.

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1 THE COURT: I think he's answered your question. He
2 said he thinks it's done but they haven't approved it.

3 BY MR. BARGREN:

4 Q. Okay. Let me just ask this question. Is Mr. Zeller
5 someone that will have to approve this, or where does the
6 approval come from?

7 A. It comes from EPA, but the State has to also concur with
8 it. And for this document, we followed the State protocol,
9 and they were the ones most involved in telling us which
10 protocol to follow. We are hopeful that it will be approved,
11 but we really -- until we get official approval, it's open.
12 We're hopeful.

13 Q. I'll bring these up and set them up here. So if you'd
14 take Plaintiff's Exhibit 15.

15 A. Okay.

16 Q. And this is a recent update on your shallow groundwater
17 treatment, correct?

18 A. Yes, sir.

19 Q. And if you go to page ten, the section on conclusions. Or
20 it's on the screen, too, if you care to look there.

21 A. Okay.

22 Q. The last bullet -- I'm sorry. Can you see that?

23 A. Yes, sir.

24 Q. Okay. The last bullet point says that the routine site-
25 wide evaluation for the potential migration of DNAPL continues

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1 to be effective. Correct?

2 A. That's what it says, yes, sir.

3 Q. Okay. And this generally reflects the general idea that
4 you feel that the remedy is up and working pretty well,
5 correct?

6 A. That's what we're saying to the agency, but if you look at
7 the map, like I talked about yesterday, that groundwater plume
8 is being drawn back to the site. We still have areas on the
9 site, you can look at a benzene map in the back, for instance,
10 that shows where we still exceed the drinking water MCL. And
11 we've not gotten approval to exceed that number, even though
12 we know that folks are not drinking that water, that is a
13 State requirement that all groundwater shall meet drinking
14 water maximum contaminant levels, and we're just not there
15 yet. We're hopeful, but we still have to keep doing this
16 monitoring, providing the reports, and we're doing this now on
17 a nine-month frequency.

18 Q. Okay. That's actually less frequent than earlier,
19 correct?

20 A. Yes, it is.

21 Q. Because things seem to be moving in the right direction.

22 A. Well, we wrote a tech memo and explained why it was
23 prudent for us to be doing that, because we have a long
24 history of data. We're seeing the plumes draw back to the
25 site, so conditions are not getting any worse, and we're

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1 hopeful that it will continue to improve.

2 Q. You mentioned benzene a minute ago, and I gather that's a
3 concern, isn't it, from the property to the north coming onto
4 the site?

5 A. Yes, sir.

6 Q. And the benzene from the north is not related to its --
7 it's a different source than the MGP.

8 A. That has not been proven. We -- we have not gotten relief
9 from that from the agencies. We do believe that there may be
10 some commingling from another source, but in one of the wells,
11 the well at the dry cleaner, if you remember that area just
12 north of our site, I believe the well number is BM03D. As
13 that well was developed, there was some tar observed on the
14 tube that's put down to develop that well, so that we knew
15 there was some tar in there. And it may have been from one of
16 the distribution lines. So I think we've got the agencies to
17 agree that there might be some commingling of another source
18 that's even further upgradient towards Washington Street. Or
19 towards East Bay Street, excuse me.

20 Q. Mr. Zeller, at his deposition the other day, was
21 discussing, or there was reference to him discussing an exit
22 strategy, correct? Do you remember that?

23 A. Yes, sir.

24 Q. And he seems to believe that you're in that sort of exit
25 strategy phase now, doesn't he?

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1 A. Well, we were talking about the technical impracticability
2 waiver that was mentioned yesterday. We're -- we are hopeful
3 that we're on the downhill slope of this 20-year project, yes,
4 sir.

5 Q. You could put that exhibit away, and then let's go to
6 Plaintiff's Exhibit 4, which is the ROD for operable unit one.
7 And there's a copy there, if you prefer to look at the paper,
8 or otherwise it will be on the screen as well.

9 I'm going to start with page 002 up in the top there. And
10 at the top where it says statement of basis and purpose, you
11 had said yesterday that this ROD selected the remedy that the
12 agencies decided needed to be implemented at the site, at
13 least as to OU-1. Do you remember that?

14 A. What question are you asking me again; I'm sorry?

15 Q. Yesterday you described the ROD as the document that
16 selected the remedy that the agencies decided needed to be
17 implemented at OU-1. Correct?

18 A. Well, what I said yesterday is the ROD contains a lot of
19 information, it covers the history of the site, the remedial
20 investigation, the results of that. And it talks about the
21 various contaminated media and different technologies that
22 could be applied to it. And it had some objectives. And in
23 this document it had those three objectives, and that's what
24 it generally describes. It never gave us a final remedy, if
25 that's what you're asking me.

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1 Q. The first sentence right there, the highlighted portion
2 says this decision presents the selected remedial action for
3 Calhoun Park. That's correct, right?

4 A. That's what the document says there, yes, sir.

5 Q. Okay. And the last couple of words in that paragraph say
6 that the State of South Carolina, acting as the support
7 agency, concurs with the selected remedy. Correct?

8 A. The document says that, yes, sir.

9 Q. Okay. Now, if we go to the next page, 003, in the last
10 paragraph of text there's a reference to a five-year review.
11 Do you see that? It says, therefore, five-year reviews will
12 be conducted.

13 A. Yes, sir.

14 Q. After the initiation of the remedial action. Correct?

15 A. It says that, yes, sir.

16 Q. Well, you say it says that. You're not disputing what the
17 document stands for, are you?

18 A. I'm saying there's other sections in the document that
19 talk a little bit differently than this, and that we never had
20 a final remedy. The five-year review that came up and was
21 discussed at Mr. Zeller's deposition, he even said that it was
22 done prematurely. So --

23 Q. Well, let's go back to something you just --

24 A. Okay.

25 Q. -- you just said. You said it doesn't select a final

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1 remedy, but it does select a remedy, doesn't it?

2 A. It talks about objectives and a treatment technology to be
3 applied. It reserves some things that need to be studied
4 further. And it mentions it will have to be covered in OU-2.

5 Q. So this doesn't select a remedy? This doesn't select
6 remedial action, despite what it says in the first paragraph?

7 A. Depends on how you're using the term remedial action and
8 remedy.

9 Q. How do you use it? How do you use it?

10 A. Well, there was no final remedy that said this is what you
11 need to do at the site, and once you implement this, this is
12 done. Typically they try to achieve that, but in order to get
13 there, you have to convince everybody about what all the
14 contingencies might be, the 'what ifs.' All right, if this
15 happens, then we're going to implement this. And to get
16 through all of those what ifs and to get consensus from a
17 group that we had going there, that's why it was actually
18 determined to go with a phased approach. And I think the
19 phased approach is talked about in this document. And so we
20 never felt like we had a final remedy. And to this day we
21 still don't feel like we have a final remedy.

22 Q. You don't have a final remedy perhaps, but you've been
23 working against this selected remedy. This selected remedial
24 action. You've been implementing at least this much of the
25 selected remedial action ever since 1998, correct?

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1 A. And it's still ongoing, yes, sir.

2 Q. Yes. Is this final remedy a term that you're pulling out
3 of the statute or something? It's not in the statute, is it?

4 A. No, I'm just speaking from dealing with other sites and
5 what they typically try to do. I know in North Carolina they
6 want a remedial action plan which says exactly what you're
7 going to do, and have everything laid out. And but even then,
8 sometimes it's an iterative approach as you get out there.

9 And like I talked about yesterday, as you do your digging, you
10 see more what's in the ground, you have a better picture of
11 what's going on three-dimensionally below the ground, and you
12 can certainly come up with better solutions to clean it up.

13 Q. Let's take a look at Plaintiff's Exhibit 10, which should
14 be in the next folder there, if you'd like the paper, or we'll
15 put it on the screen as well. And if we go to page ten of
16 this exhibit, and actually let's go back to page one. We
17 talked about this, or you talked about this document a little
18 bit yesterday. This is a five-year review report in draft
19 form that was started, and then this document happens to
20 include the mark-up from Ed Hanlon, correct?

21 A. Yes, sir.

22 Q. So these are edits he made to the draft he was reviewing,
23 correct?

24 A. I seem to believe he may be with the Corps of Engineers,
25 may have been the one that drafted it.

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1 Q. Well, it says right there, 3/15/07 comments from Ed
2 Hanlon. And who is he?

3 A. To the best of my knowledge, and I'm trying to recall
4 here, I think he was with the Corps of Engineers.

5 Q. Or was he with the EPA in Washington?

6 A. I --

7 Q. Okay.

8 A. If you know, you tell me. I don't know.

9 Q. Let's go to page ten. One of the comments Mr. Hanlon
10 inserted in the third paragraph suggesting this language for
11 inclusion in this document. This is the first five-year
12 review of the Calhoun site. And then he says in about the
13 third sentence, statutory reviews require that five-year
14 reviews occur within five years of initiation of the first
15 remedial action at the site. You see that?

16 A. Yes, sir.

17 Q. And then the next sentence says the first remedial action
18 at the site commenced on March 12, 1999. Correct?

19 A. That's what it says, yes, sir.

20 Q. Okay. And he's referring to work that SCE&G did.

21 Isn't --

22 A. I believe he is, yes.

23 Q. -- in response to the ROD one. Correct?

24 A. Yes, sir.

25 Q. Then let's go back to Plaintiff's Exhibit 4, and it will

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1 be page two again. So we're back to the ROD now. And on this
2 page this paragraph says description of selected remedy about
3 halfway down there. And it says this remedial action --
4 Correct?

5 A. Yes.

6 Q. -- addresses NAPL source areas, shallow groundwater
7 contamination, contaminated soil as the principal threat at
8 this site. And then it goes on to say that sediment and
9 surface water contamination and intermediate groundwater
10 contamination will be addressed in a separate ROD. Correct?

11 A. That's what the document says, yes, sir.

12 Q. And that separate ROD turned out to be the ROD for
13 operable unit two that was issued in 2002. Correct?

14 A. Operable unit two was issued in 2002, yes, sir.

15 Q. And that's the separate ROD that's referred to in this
16 document.

17 A. Yes, sir.

18 Q. Then if we go to page 51 of this exhibit, it's 0051. And
19 here it does talk about intermediate groundwater which is what
20 is going to be addressed in the future ROD, correct?

21 A. Yes.

22 Q. And the last half of the paragraph down there says because
23 the extent of the dissolved groundwater contamination plume
24 within the immediate aquifer was not well defined during the
25 remedial investigation, additional investigation will be

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1 performed to characterize the extent of this contamination and
2 present it as operable unit two under a separate ROD.

3 Correct? That's what it says.

4 A. Yes, sir. That's what it says.

5 Q. And then it says this separate ROD will address the issue
6 of source removal and disposition of this source for the
7 intermediate aquifer within the selected remedy section of the
8 ROD.

9 And that's exactly what the ROD for OU-2 did, isn't it?

10 In part.

11 A. The ROD for OU-2, again, documented the follow-up
12 investigations that were done for intermediate groundwater and
13 sediments, and then it addressed the issues of intermediate
14 groundwater, surface water and sediments, and hit the three
15 objectives just like they did here, and talked about different
16 potential applications of technologies to effect a cleanup for
17 those three media. When they let the surface water one --
18 they took it off the table, saying that it was no longer a
19 threat.

20 Q. Right. So you didn't have to do that.

21 A. Correct.

22 Q. You mentioned a couple of times the three objectives, the
23 removal, containment and restoration of the aquifer, correct?

24 A. Yes.

25 Q. Okay. When you use removal in that three-part list of

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1 objectives, you're talking about excavation of soil or tar
2 with a backhoe, correct?

3 A. Removal.

4 Q. In part.

5 A. Yeah, removal can mean by any mechanism.

6 Q. Right.

7 A. It's just getting it out of the ground so it's no longer a
8 threat to groundwater.

9 Q. Right. So one way to remove is digging and another way to
10 remove is through extraction wells.

11 A. It depends on what you're trying to remove. One is going
12 to be more effective than the other.

13 Q. But they're both -- they're both means of removal, right?

14 A. Not for tar, no, sir. You're not going to remove tar with
15 extraction wells.

16 Q. No, but we're not talking about tar necessarily, we're
17 talking about NAPL and NAPL soil and NAPL water, and that can
18 be extracted through wells.

19 A. Well, NAPL is tar in this situation.

20 Q. They're called DNAPL recovery wells, right? DRWs?

21 A. Those are the ones we installed in the perimeter, yes,
22 sir, we are recovering tar with those extraction wells.

23 Q. Right. So that's part of your removal or extraction of
24 contaminants at the site.

25 A. That is part of what we are have implemented to remove

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1 source material at the site.

2 Q. Now, if we go to page 24 of this exhibit. Let's try the
3 next page. Or the previous page. We'll let that one go.

4 You'd mentioned yesterday the importance of doing work in
5 response to work plans. Do you remember that?

6 A. Yes, sir.

7 Q. And I'm going to hand you an exhibit that was marked at
8 your deposition.

9 MR. BARGREN: And I handed a copy to the clerk
10 earlier, Your Honor. This will be our next exhibit,
11 Defendant's 266. I gave a copy to counsel yesterday.

12 Q. And you've seen this letter before, Mr. Effinger, correct?

13 A. I believe I have.

14 Q. We discussed it at your deposition, among other things.
15 Do you remember that?

16 A. Can I review it to refresh my memory?

17 Q. Sure.

18 A. Okay.

19 Q. This letter is addressed from Kevin Bowick at the EPA to
20 Miss Partlow, who is counsel for SCE&G, correct?

21 A. Yes. She was in this matter at that time.

22 Q. Right, handling remediation type things. And in the
23 second paragraph of the letter seems to me Mr. Bowick is
24 appreciating the work that's been done, but he says a great
25 deal of work is presently being performed at the site, SCE&G

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1 has already performed work that is likely to become part of
2 the site remediation. Do you see that?

3 A. Yes, sir.

4 Q. And this is just after the ROD came out, about six months
5 after the ROD came out. And talks about wells, and then the
6 last sentence says, while EPA recognizes this effort, it must
7 be pointed out that none of this work has been performed
8 pursuant to an approved work plan. Correct?

9 A. Yes, sir.

10 Q. And that was Mr. Bowick's opinion.

11 A. Yeah, he's got it in this letter, yes, sir.

12 Q. Okay.

13 A. I'm not sure what he's referring to though. I don't
14 recall what issue. He seems to be talking about some wells
15 that may have been installed, and I honestly can't remember
16 what the issue was in this letter.

17 Q. Let's move on to Plaintiff's Exhibit 5, which is the ROD
18 for OU-2. And you can pull that. I just wanted to go through
19 a couple of things in there, showing what work had been done.
20 And I think I'll ask Andrew to highlight these as we go.

21 MR. BARGREN: If we go to the page with Section 2.3
22 on it. It's page 14 in the exhibit. We'll start with page
23 14. Document page seven. 28518.

24 Q. And the first -- I guess it's the second block of text
25 there at the top of the page, there it relates back to the ROD

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1 for OU-1, correct?

2 A. Yes.

3 Q. And it says the ROD for OU-1 stated that intermediate
4 groundwater, sediments and surface water would be addressed in
5 a separate ROD. And goes on to say basically this is the ROD
6 that we talked about in the first ROD. Correct?

7 A. Yes.

8 Q. And the OU-2 addresses the principal threat through
9 removal of DNAPL to the maximum extent practical. Continues
10 the phased approach that you described earlier that started
11 with the ROD one, correct?

12 A. Yes.

13 Q. And will be followed by containment and so on. And then
14 now if we go back to page four of the document, three pages
15 earlier, it describes previous response actions there, Section
16 2.3. Do you see that?

17 A. Yes, I see that.

18 Q. Okay. And again, if you prefer paper copy, it's up there.

19 A. Okay.

20 Q. Looks like you're doing okay.

21 A. Yeah.

22 Q. Previous response actions, it says significant remedial
23 efforts have been completed to date to address environmental
24 impacts from past MGP operations at the CPA site. Those
25 actions are summarized below, correct?

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1 A. Are you asking me --

2 Q. That's what it says.

3 A. -- to read it, or what it means?

4 Q. I'm asking you, is that what it says? That's what it
5 says, right?

6 A. Yes, sir. That's what it says.

7 Q. All right. And so let's go down to that list of actions,
8 the first one is sediment containment. This is something the
9 City did, is that right?

10 A. Sediment containment. It talks about the containment
11 system that the City installed as part of their work putting
12 in the Aquarium, and then also over at the tour boat facility,
13 the work that I mentioned that EPA had to overview, and they
14 had to get permits from the Corps of Engineers and everybody,
15 and they had to -- they also had to do a demonstration project
16 on that in order for that work to be done, and that mentions
17 that demonstration program here.

18 Q. This sediment containment work was started in the mid
19 1990s, correct?

20 A. Yes, sir, it was.

21 Q. Then the next item is the Calhoun Street drain project.
22 This is also work the City did, correct? That's the work that
23 was referenced in the \$26 million agreement we saw yesterday?

24 A. This is work that the City did, yes, sir.

25 Q. And it's the work that's referenced in that agreement,

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1 correct?

2 A. I believe it probably -- in the agreement between SCE&G
3 and the City for the 26 million?

4 Q. Yes.

5 A. I believe it probably is included.

6 Q. And this work was also done -- well, at least before 1998,
7 correct?

8 A. I don't know about that. I don't recall the timing.

9 Q. The next item is soil removal and seep remediation. Here
10 it talks about remediation efforts at the CPA site have
11 included removal of impacted unsaturated zone soil and so on.
12 Do you see that?

13 A. Yes, I see that.

14 Q. Okay. By the way, this report, was this drafted and sent
15 to the EPA by your consultants?

16 A. Which one are we talking about?

17 Q. This is the ROD --

18 A. OU-2?

19 Q. OU-2.

20 A. I think you've got before me the final one from EPA.

21 Q. Okay.

22 A. Yeah, this is the final one back from EPA. We did -- we
23 do often help them prepare sections of it, if that's what
24 you're asking me.

25 Q. Yes. This is the final EPA official document. Right?

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1 A. The one you have in front of me, yes, sir. It's signed
2 and got all the attachments and all of that.

3 Q. And this paragraph points out that this soil removal was
4 completed in 1998, that's referenced in this paragraph. Do
5 you see that in about the middle of the paragraph?

6 A. Here it's talking about the 6000 cubic yards that was for
7 the zero to three-foot soil, so that's surficial soil that
8 would not have any groundwater in it. I believe that's what
9 it's talking about.

10 Q. And then the next paragraph, which goes on -- is on page
11 five, talks about remediation efforts -- top of the page.
12 Talks about remediation efforts in '99, and what they focused
13 on, and that was work that SCE&G did, correct?

14 A. The seep mitigation activities, and they mention the
15 sediment that was pulled out, and they used a long stick to do
16 that, installed a sheet pile wall. That work was done under
17 that AOC that was issued for a rapid mitigation of the seep
18 they found late in the effort.

19 Q. Right. And that work was done by SCE&G, correct?

20 A. Yes, that work was done by SCE&G.

21 Q. Then the next paragraph talks about -- first sentence
22 there, remediation efforts focusing on source delineation,
23 removal at these other areas that you described yesterday.
24 And it says that work began in 1999, correct?

25 A. It talks about removal that started in '99, yes, sir.

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1 These excavations began in '99.

2 Q. And that again is work that SCE&G did.

3 A. That was SCE&G's work, yes, sir.

4 Q. And work that you're claiming costs for -- you've advanced
5 costs for in this action.

6 A. That's part of that 63,000 tons of soil that was removed,
7 yes, sir.

8 Q. Okay. And then just a couple of more elements here. The
9 next paragraph talks about shallow groundwater remediation,
10 and here we have the planting of the trees, the
11 phytoremediation. Correct?

12 A. Yes, it's talking about trees being used as remediation.

13 Q. And the trees were first planted in November 1998, and I
14 believe some more were planted later, correct?

15 A. Yes.

16 Q. Okay. By the way, excavating soil, extracting tar and
17 shipping it off site, shipping contaminated soil off site,
18 that's a pretty permanent remedy, isn't it? That's not going
19 to come back.

20 A. For the particular areas that you're working on, you are
21 getting a fair amount of source out. The problem is you never
22 know whether you've gotten every molecule out, and you would
23 have to dig the entire area. So we're waiting to see how it
24 responds to see if we have to implement those other measures.

25 Yesterday Judge Houck asked me if we would have to put in

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1 additional containment, what that might be. Sheet piling or
2 grout curtain or whatever else, and we still don't know if
3 that's going to be required.

4 Q. My point is --

5 A. We're hopeful that it will not, but even after you do the
6 excavation, there's still going to be residual impacts at this
7 site that we'll continue to monitor. And as the agencies ask
8 us to do additional work, we'll be obligated to comply with
9 that.

10 Q. My point is that when you excavate a yard of soil or tar
11 or contaminated soil, and take it off site, that yard is not
12 coming back. That yard is permanently gone. Right?

13 A. If you catch everything that's --

14 Q. No, I'm talk --

15 A. -- has the source material in it, then you're not going
16 to have residual impacts.

17 Q. Let's move on to Plaintiff's Exhibit 7. That should be up
18 there for you. This is the IRA. This is the one you said
19 yesterday that because of the time this work was implemented,
20 meaning in the mid 90s or late 90s, the EPA felt it was a good
21 idea to go ahead and capture or summarize work that had been
22 done to date, correct?

23 A. Yes, sir.

24 Q. And that's what this report does? In part, at least?

25 A. It captures it for OU-1, for that removal action, and

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1 that's primarily its focus.

2 Q. Okay. Let's go to page four of this document, 90356. And
3 in Section 1.3.2, administrative order on consent, this
4 describes the AOC that was issued in May '98, correct?

5 A. Yes, it does.

6 Q. And this is the AOC under which you did the work at the
7 Charlotte Street seep, and then some of the work at the
8 parking garage, correct?

9 A. Yes.

10 Q. Okay. And it -- now, this IRA was written by SCE&G or its
11 consultants, correct?

12 A. Yes, it was written by our consultants, again, to capture
13 the work and kind of tie up the loose ends for things that had
14 been completed on the excavation.

15 Q. And then it says in the middle of the paragraph there, it
16 is important to note that the AOC was approved and implemented
17 prior to EPA issuing the ROD for OU-1, and it goes on to say
18 this was done by mutual agreement between the regulatory
19 agencies and SCE&G to facilitate the source removal excavation
20 activities prior to the construction of the parking garage and
21 other redevelopment activities. Correct?

22 A. Yes, sir. The reason they wrote that is they're trying to
23 capture the AOC work in with this IRA to, you know, kind of
24 tie it together, too. So you have this removal report picking
25 up that AOC work as well as this -- the work that was done to

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1 date for OU-1.

2 Q. And there were two items in the AOC, the Charlotte Street
3 seep and the parking garage work. And the Charlotte Street
4 seep, I mean, that was a true emergency, right?

5 A. Yes, it was.

6 Q. That, I think, you said maybe at your deposition, gave you
7 some sleepless nights and people were concerned about that
8 because it appeared suddenly, kind of without warning?

9 A. I -- did it give me sleepless nights? I don't know about
10 that, but it was something that came onto us all of a sudden.
11 We had to take immediate actions with boom deployment, long
12 stick excavator and the storm drainage work. We had to put in
13 an oil-water separator arrangement to kind of manage anything
14 that might come down that pipe. And install some wells to
15 make sure that it didn't recur.

16 Q. And you said yesterday you had to jump out there. I mean,
17 this was an environmental emergency, correct?

18 A. It was something that needed quick attention, yes, sir.

19 Q. Now, that's different than the work under the parking
20 garage, where the emergency there, if there was an emergency,
21 had to do with pressure from the City to get this garage built
22 and opened in time for the Aquarium, right?

23 A. Well, the urgency there, in discussion with the agencies,
24 was let's go ahead and get the soil out before the garage
25 covers it, and it would no longer be accessible.

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1 Q. Right. And if the garage, for whatever reason, had not
2 been built for, say another five years, you could have
3 addressed this soil differently, right?

4 A. There would have been less of a sense of urgency.

5 Q. Right.

6 A. Yeah.

7 Q. And that was true throughout the site, right? That was
8 true throughout the site?

9 A. Not site-wide, I wouldn't say. There was some pressure
10 from the State and EPA to manage this site and get it taken
11 care of. They had known about it for awhile, I suppose, but
12 it really came to the forefront in the late 80s when the City
13 determined they were going to build their -- redevelop that
14 area. But then there's always a desire by the agencies to get
15 it cleaned up sooner rather than later.

16 I would tend to think that the redevelopment helped us a
17 little bit, because it helped move things forward, it got
18 quicker agreement from the agencies on how to manage things.
19 It helped us all focus on the matter at hand, instead of
20 discussing all the what ifs. What if when we implement this
21 and this contingency happens, how are we going to capture
22 that. So --

23 Q. As different areas were disturbed around the site by
24 construction, either yours or somebody else's, then you would
25 go out to see if there was evidence of tar or contamination,

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1 right?

2 A. We took that as an opportunity to manage that soil
3 ourselves, rather than somebody else managing it and then
4 filing a claim against us for their --

5 Q. Right.

6 A. -- for their increased costs.

7 Q. But until the soil was disturbed, in many cases through
8 construction, you didn't go out and examine that particular
9 soil.

10 A. Well, the majority of the soil that we removed, we needed
11 to go out and get anyway. If there were opportunities where
12 they were working in the street, which you normally would not
13 be allowed access to, then we would move that soil out. But
14 that was a -- probably a much smaller fraction than what the
15 main component of the 63,000 tons were.

16 Q. And the soil that was removed related to construction
17 activities, that was done more or less on the schedule of the
18 construction workers, not on SCE&G's schedule.

19 A. The -- there was construction over at the Aquarium
20 property and over at the Park Service, and that soil that was
21 removed was done by those folks. And you'll see some of that
22 in those back charges or those description of increased
23 environmental expenses from the City.

24 So their construction, you know, and their workers, yeah,
25 they managed that soil at their schedule. But there was a

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1 couple reasons we worked off site. We went over to that
2 Luden's areas first when we were digging below the saturated
3 zone. And part of that was because of their schedule and
4 wanting to get things done before they had to get in there and
5 do their construction. The other part was working our way
6 back from the Cooper River. Because the real harmed receptor
7 might be the Cooper River from those groundwater contaminants
8 discharging to the Cooper River. So it really made sense for
9 us to hit those areas first, to capture the areas closer to
10 the Cooper River and work our way back to the substation.

11 Q. We talked about this a little bit at your deposition, do
12 you remember, and I'd like to play that clip. It's page 183
13 line 18 through 184, 13.

14 (Video deposition testimony was played as follows:)

15 Q. "So the question there is if the construction had not been
16 underway anyway --

17 A. Um-hum.

18 Q. -- is that soil that you would have gone in to excavate?

19 A. That was not soil that they were requiring us to go in and
20 excavate, because it was underneath that road, but as you go
21 in and disturb it, now you have to take it out and clean it
22 up.

23 Q. So at least until it was disturbed, it was okay with the
24 agencies to leave it there?

25 A. They had not required to us do anything with it on the

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1 Charlotte Street until that time. But that's the case with
2 everything that happens in that area. As different areas get
3 disturbed, our folks go out there to see if there's evidence
4 of tar. And if there is, then we directly manage it and we
5 make sure that those workers are protection. So in a sense,
6 it's part of the construction worker health and safety plan
7 that we're required to do that."

8 (Videotape stopped.)

9 BY MR. BARGREN:

10 Q. Now, that talks in particular about the Charlotte Street
11 work, I think, that involved the tunneling of this cable
12 across the river, doesn't it?

13 A. Yes, sir.

14 Q. Yeah. But there, the soil that was removed wasn't
15 hazardous, right?

16 A. There was some contaminated soil in that area. Are you
17 asking me if it's hazardous waste or -- what its constituents
18 were.

19 Q. Let's go to page -- Exhibit 7, which is the IRA, and it's
20 page 30, SCANA 90382. And should be Section 8.4.1. Bates 82.
21 And that disposal section there. This relates to phase eight,
22 right, because it's chapter eight. Do you remember that?
23 Take time to look at the report, if you care to.

24 A. This is out of the IRA? Is that what you're talking
25 about?

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1 Q. Yes. The document page is 30, I believe? Thirty-seven.

2 A. Page 30.

3 Q. Thirty-seven.

4 A. Thirty-seven. I'm sorry, which document are you in again?

5 Q. It's the IRA, page 37.

6 A. Page 37.

7 Q. I'm sorry, it is page 30. Page 37 of the exhibit, page 30
8 of the document.

9 A. Okay. I've got it now. Thank you.

10 Q. And that relates to the phase eight work, which was taking
11 soil that was excavated as part of this underground cable
12 tunneling process, right?

13 THE COURT: What are you getting at?

14 MR. BARGREN: One sentence here.

15 THE COURT: I mean really, I don't understand where
16 you're going. This is pretty clear. I know what that means.

17 MR. BARGREN: It says nonhazardous soil was removed
18 there. Says in the document.

19 THE COURT: Well, you used the word hazardous. He
20 said he didn't know what you meant when you said hazardous.

21 MR. BARGREN: I'm sorry if I did.

22 BY MR. BARGREN:

23 Q. The document says that this was nonhazardous soil was
24 removed and transported, right?

25 THE COURT: What's the importance of that?

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1 MR. BARGREN: Nonhazardous isn't CERCLA waste.

2 THE COURT: Okay.

3 A. There was impacted material there, especially where we did
4 the -- there was a manhole for them to pull the cable through,
5 and I know there was tar in that area, so this may be a
6 misstatement where they were referring to it as either
7 hazardous or nonhazardous waste. At the MGP site there is
8 a -- federal laws don't require it to be treated as hazardous
9 waste, unless it has underlying constituents which exceed
10 certain numbers. So even if it has tar in it, it would not
11 necessarily be hazardous waste, if it comes from an MGP site,
12 because the courts have vacated TCLP testing. So I think what
13 he's saying here is this is nonhazardous waste soil. We
14 wouldn't send it to Pergo, unless it had tar in it and needed
15 to be thermally treated to remove tar.

16 THE COURT: Where is Pergo?

17 A. Pergo is in Virginia.

18 THE COURT: You didn't give the name earlier. That's
19 the second place it went to?

20 A. First it was in Summerville with Banks Construction, and
21 when they shut down we started taking it to Pergo, yes, sir.

22 THE COURT: How would you determine that something
23 did have -- Would you test it before you took it to Pergo?

24 A. Well, it typically is pretty easy. If it has the tar
25 there, you can smell it, but it's got -- it's thick and gooey

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1 sometimes, but normally you get that odor. And the odor
2 coming off of it is from the naphthalene and the benzene, it
3 will smell like creosote.

4 THE COURT: When you take something out of the ground
5 and it doesn't have any evidence of tar in it, what would you
6 do with that soil?

7 A. Then we would send it to the Oakridge landfill that is
8 mentioned here, and it's taken there and it's put in a
9 Subtitle D landfill, so it's not hazardous waste, but you
10 still manage it at something on the order, you know, 20, \$25 a
11 ton. So it's much cheaper to do that.

12 THE COURT: Okay. Go ahead.

13 BY MR. BARGREN:

14 Q. Let's go back to Plaintiff's Exhibit 4 again. And the
15 page I'd like you to turn to is 0032. And here is one of the
16 places that talks about something you mentioned a couple of
17 times, worker safety as being part of the remedy. Correct?

18 A. Worker safety is an important component and needs to be
19 followed at the site, yes, sir.

20 Q. Right. And this paragraph here that says the evaluation
21 of commercial workers, the second sentence of that actually
22 says, as evidenced in table one, risks under the construction
23 worker and long-term worker scenarios were largely driven by
24 incidental ingestion and/or dermal contact with surface and
25 subsurface soils. Dermal contact means getting it on your

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1 skin, right?

2 A. Yes, sir.

3 Q. And you had precautions in place for workers and safety
4 programs and a health and safety plan and all of those things,
5 right?

6 A. Yes, sir.

7 Q. So let's look at a couple of pictures from Plaintiff's
8 Exhibit 35, which might take just a second to get up here.
9 And while that's coming up, I mean, you mentioned worker
10 safety a number of times and it's in the documents, right?

11 A. Yes, sir.

12 Q. Okay.

13 MR. BARGREN: Let's take a look at the first picture
14 that we pulled out, Andrew.

15 Q. The top right picture there, you described this yesterday.
16 I mean, these are workers wading in a superfund site, aren't
17 they?

18 A. These are workers applying an armoring cap to a sand
19 blanket that is on top of contaminated sediments, yes, sir.

20 Q. Yeah, I don't see safety equipment there.

21 A. Well, they're not in a position to be in contact with
22 contaminated sediments.

23 Q. They just waded right in?

24 A. Yes, sir.

25 Q. Okay. By the way, they're putting down armor lock, is

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1 that right?

2 A. They're putting down armor lock. And here I think they're
3 putting down the oyster bags, increasing the -- that oyster
4 habitat that we were requested to do.

5 Q. That armor lock, just to digress, the armor lock was not
6 required by the EPA, correct?

7 A. The armor lock is required by our approved work plan, and
8 that was approved by EPA.

9 Q. Okay.

10 A. The reason it was required is that the commenting agencies
11 have an opportunity to not only direct EPA on what they can
12 approve, but they also have the ability to interact with the
13 Corps of Engineers in issues that deal with working in the
14 Cooper River.

15 MR. BARGREN: Let's go to the next picture that we
16 pulled up. Let's take the next page. The top picture there,
17 actually get the title as well, Andrew.

18 Q. This is phase two, this is one of the phases that's
19 described in the work papers and report paper, right?

20 A. Yes, sir.

21 Q. Okay. This is part of the construction of the garage?

22 A. The parking garage, yes, sir.

23 Q. And that's contaminated soil these guys are in dermal
24 contact there with, right?

25 A. No, this should have been after we removed the soil, that

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1 6000 yards that was mentioned, so -- so we should have gotten
2 the surface soil out before they're actually installing the
3 auger piles.

4 Q. That wasn't one of the whole issues with these auger
5 piles, the reason it's claimed as part of the remediation,
6 because that augering soil had to be monitored?

7 A. I don't -- I don't know about that right offhand, Paul.

8 Q. Okay. And let's take a look at one more picture. The
9 bottom picture there, this is parking garage, and there are
10 your workers, right? Or your contractor's workers.

11 A. Yeah, the contractor's.

12 Q. I don't see Tybek suits there, I don't see dermal
13 protection, do you?

14 A. There was no -- to my knowledge, there was no need for it
15 there. But I'd have to know exactly what area of the parking
16 garage you're dealing with. Some of the areas had
17 contamination and some did not. Our folks -- you would --
18 they're not in this picture, but they would be out there doing
19 air monitoring and checking to see if any of the soil that was
20 uncovered would have that black stained creosote or tar in it.
21 And so where you don't observe that, you're not at any more
22 risk than when you put gasoline in your car. You know,
23 benzene is a component of gasoline that you put into your car,
24 and you're not as concerned about that getting on your hand.
25 So if they're not in contact with the tar soil, then we

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1 wouldn't normally require them to put on Tybek suits.

2 Q. Okay. Let's just talk a little bit about this site
3 overall then. You said yesterday that gas making operations
4 at this site started in 1855, right?

5 A. That's what I understand from the record. I don't have
6 firsthand knowledge.

7 Q. I understand. But we can expect, at least based on your
8 understanding, you would expect that there was some tar in the
9 ground in 1855, right? Maybe.

10 A. I don't know the answer to that.

11 Q. The plant continued to operate until 1957, right?

12 A. Yes, sir.

13 Q. Okay. And then as early as the 1970s when the substation
14 was put in, SCE&G saw some tar at the site, right?

15 A. Yes, there was some tar observed at the site.

16 Q. So at least by then, and certainly probably earlier, when
17 SCE&G was operating the plant up through 1955, SCE&G saw some
18 tar at the site, right?

19 A. Well, even in 1978 as they observed that tar, they were
20 unsure what to do with it. And at the time, they contacted
21 the State agency, DHEC, and I believe there's even a letter,
22 we may have given you, that showed where DHEC said yeah, go
23 ahead and build your substation there. So they really weren't
24 sure how to manage it then back in '78, manufactured gas
25 plants were just coming out into the environmental world as

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1 being a significant issue that folks needed to take care of.

2 Q. But even during the process of building the substation,
3 you drilled some holes down through that went down to the
4 intermediate groundwater and formed a pathway for tar down to
5 the groundwater, right?

6 A. That's what's been speculated, along with the fact that
7 there were other structures like the gas holder itself, you
8 know, setting down 30 feet, so it went through the clay layer.
9 But they did speculate that in building the substation, it may
10 have opened up a pathway.

11 Q. And then problems were identified starting in about -- in
12 the 1980s with the Ansonborough Park, Ansonborough Homes
13 project issues, right?

14 A. I believe that all started in the late 80s.

15 Q. Then the investigations began, and the AOC came out in
16 1993, the remedial investigation followed in 1996; this was a
17 long process, wasn't it?

18 A. Yes, sir, it was a long process, and still is.

19 Q. And then the remedy was put into place and work began,
20 SCE&G began work in 1998. And as you say, it continues today.

21 A. Yes. SCE&G began cleanup of this site in '98, and work
22 continues today.

23 Q. And we've talked about the emergency at the Charlotte
24 Street seep area.

25 A. The Charlotte Street seep was something that needed

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1 immediate attention, yes.

2 Q. But the rest, it's a long-term process, it's a long-term
3 remedy.

4 A. It was never intended to be on the front end. As a matter
5 of fact, EPA was trying to implement a superfund accelerated
6 cleanup model. I don't know if SACUM is even talked about
7 much these days, but the idea was to, you know, get the
8 cleanup going so that this area could be redeveloped. It was
9 part of an initiative that was pervasive at the regulatory
10 areas to turn properties that had been contaminated, back into
11 productive use. As a matter of fact, this site actually
12 received a Phoenix award, which is a Brownfield award for
13 revitalizing this whole area and doing the cleanup. So it was
14 a -- to EPA and to the State, it was a model of success.

15 Q. I understand that, but it was also understood from the
16 beginning that this would be a long-term project with
17 long-term monitoring. You knew from the start when you became
18 involved that it would be decades, right?

19 A. Well, we had a strong suspicion, yes, sir.

20 Q. Okay. And, in fact, we talked -- there was talk yesterday
21 about this technical impracticability waiver which would end
22 the project earlier, actually, right?

23 A. Well, what it would do, what it would alleviate those
24 drinking water cleanup standards, at least from our electric
25 substation where there's no potential use, and we'll continue

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1 to own and control that property, but there would be no
2 ability for anyone to go install drinking water wells.

3 Q. No, but I mean if you're granted a TI waiver, then you can
4 effectively, shorthand, say, stop work earlier than if you had
5 to go on and go for the MCLs.

6 A. Even with a TI waiver, you don't walk away from the site.
7 You'll still be doing monitoring and we still have ongoing
8 obligations. And even with OU-2, the -- or with the
9 intermediate groundwater, the letter from the State says that
10 we need to go back and do work on Ports Authority when they
11 get off.

12 So the agencies reserve the right to make us do additional
13 work to achieve those three objectives. But what the TI
14 waiver would do is it would relieve us, it would give us some
15 relief on the drinking water standards for groundwater
16 underneath the electric substation.

17 Q. My point is that when this work started and when the ROD
18 was issued in 1998, it reflected the TI waiver, and at that
19 time SCE&G knew that this would be a long process to try to
20 work toward a TI waiver, right?

21 A. Yes, sir, we know it's a long process.

22 Q. And none of the work that's been done so far --

23 MR. BARGREN: Your Honor, I think I'll finish up
24 about 11:30, if that's okay.

25 THE COURT: Okay.

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1 BY MR. BARGREN:

2 Q. None of the work that's been done so far is wasted, right?

3 That SCE&G has done. It you consider it all to be in

4 compliance with the ROD one or ROD two?

5 A. I believe all the work that we have done has been helpful

6 towards cleaning up this site.

7 Q. Is it in compliance with the RODs?

8 A. I believe it's generally in compliance with the RODs.

9 Q. Consistent with the RODs.

10 A. Excuse me?

11 Q. Consistent with the RODs?

12 A. I believe it's consistent with the RODs, yes, sir.

13 Q. And the work that was done, it goes both ways. The work
14 that was done consistent with ROD one is also consistent with
15 ROD two, correct?

16 MR. FELMLY: I'll object to the form of that
17 question, Your Honor.

18 THE COURT: What's wrong with it?

19 MR. FELMLY: It hadn't even existed at the time.

20 THE COURT: Say what?

21 MR. FELMLY: Pardon? The work that he's describing
22 as consistent with it is with respect to a document that
23 didn't even exist and hadn't even created any of the
24 objectives yet.

25 THE COURT: I'm not sure I follow you. His question

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1 was, it was consistent with ROD one and ROD two.

2 MR. FELMLY: Right. And what I'm saying is work that
3 was done inconsistent with ROD one, and was undertaken at that
4 time back in 1998. To try and argue that it's consistent with
5 a document that is going to be based on further studies,
6 investigations, and hasn't even been developed, I think, is an
7 improper question.

8 THE COURT: I'll let him answer it. Go ahead, sir.
9 If you can answer it.

10 A. Okay.

11 BY MR. BARGREN:

12 Q. I'll say as you sit here today looking back. I'll
13 rephrase the question.

14 A. Okay.

15 Q. As you sit here today looking back at the work that was
16 done consistent with ROD one, that's been consistent with ROD
17 two, as well, right?

18 A. Let me just answer it this way. I believe both RODs have
19 the same objectives, and they deal with different media. So
20 they're both aimed at removing that source material to the
21 maximum extent practicable, containment of the nonrestorable
22 source areas, and then restoration of the aqueous phase plume.

23 Sediments is a little bit different issue, because there
24 we ended up capping it.

25 So those three objectives are mentioned in both RODs, but

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1 it really discusses two different sets of media and talks
2 about different technology. So that's the best way I know to
3 answer that question. I'm sorry, Paul.

4 Q. The -- Sorry, I lost my train of thought.

5 Some of the work you just described in describing through
6 your testimony, deals with this phased approach. And the
7 phased approach was identified in the first ROD and continued
8 in the second ROD, right?

9 A. Yes, sir.

10 Q. So SCE&G knew from the time of the first ROD that this
11 would be a phased approach.

12 A. We knew that we would be dealing with media in phases, and
13 seeing how they responded. And then be asked to try different
14 things or go after different specific areas of the site.

15 We did see the site expand, you know, and we didn't expect
16 to be that far upgradient of the site when we started looking
17 at intermediate groundwater. So in that phased approach it
18 had us look at additional areas and look at additional
19 accedences.

20 Q. You learned in the mid 1990s by looking at some drawings
21 and maps and things, that a company called UGI, in your view,
22 might have some relationship to this site. Right?

23 A. I don't know that I learned that in the mid 90s, I think
24 it was much later on that I recognized that there was some UGI
25 involvement at this site.

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1 Q. You told me at your deposition, I believe, that you had
2 looked at this large map and you said it said copied from UGI
3 or UGI equipment or something like that?

4 A. We had some old maps that referenced various pieces of
5 equipment. And I had noticed that at least for some of those
6 pieces of equipment, like a super heater and carburetor and
7 all of that, it referenced UGI, and I did not know what it
8 meant in the mid 90s. So it wasn't until much later when it
9 was brought to my attention that UGI was a company that owned
10 and operated your site, that was the first that I realized
11 that there was somebody else that had operated the Charleston
12 MGP site.

13 Q. When did that come to your attention?

14 A. I don't remember the exact year, Paul.

15 Q. Was it before the ROD?

16 A. No, it was not before the ROD, it was after OU-2.

17 Q. So UGI was never involved in the public input phase or the
18 community input phase of the ROD?

19 A. Not to my knowledge, UGI was never involved in the
20 community participation.

21 Q. They were never asked because nobody knew to ask them at
22 that point.

23 A. Nobody knew to ask them, that's correct.

24 MR. BARGREN: If I could have just a minute, Your
25 Honor.

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1 THE COURT: Sure.

2 MR. BARGREN: That's all I have on cross. Subject
3 to, I guess, reserving any rights if Mr. Effinger is called
4 back later to talk about financial information.

5 THE COURT: Say what now?

6 MR. BARGREN: If Mr. Effinger is called back later to
7 talk about financial information and so on, I obviously would
8 reserve the right --

9 THE COURT: I'm not going to let him call him back
10 and not let you ask him some questions.

11 MR. BARGREN: Thanks very much.

12 THE COURT: Let's take about 15 minutes.

13 (A recess was held at this time.)

14 THE COURT: You know, you walk into the courtroom
15 when you've got a jury trial, and everybody is standing up,
16 and of course you come up here and sit down, and when you sit
17 down you realize they're not standing up for you, they're
18 standing up for the jury, because they keep standing. So I
19 wondered why y'all were standing, and I realized that I'm the
20 jury.

21 Go ahead; redirect?

22 REDIRECT EXAMINATION

23 BY MR. FELMLY:

24 Q. Mr. Effinger, a few things that I want to talk with you
25 about. Mr. Bargren was asking you about work plans and a

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1 letter that Mr. Bowick had sent to Attorney Partlow asking
2 about a particular work plan and seemingly asking to get it or
3 get it more quickly. Can you just explain to us, based on the
4 many years you've had on this site, the extent to which your
5 company has been compliant or not compliant in terms of
6 providing work plans to the EPA on the things you're going to
7 be doing on that site?

8 A. Overall, our working relationship has been extremely
9 positive. I think on the front end though there was a lot of
10 anxiety about what the City wanted to do, and just about how
11 to deal with manufactured gas plants in general. So there was
12 a lot of uncertainty. There was a lot of very vigorous
13 discussion about what would be the appropriate technology and
14 how to allow the City development to move forward. But
15 overall, with EPA and even with -- even with their attorney,
16 Kevin Bowick, I think they've been very complimentary of the
17 work that SCE&G has done. I didn't recall that specific
18 incident where he was referring to some wells.

19 Q. Now, there was some pictures shown of the individuals that
20 were helping to install this cap on the sediments down along
21 the river near the Aquarium, and the issue was whether they
22 were unprotected. And I know you explained that. But what I
23 wanted you to do is to explain to the Court how far were those
24 workers removed from physical actual dermal contact with
25 sediments, contaminated sediments, when they are putting that

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1 material down on top of the sand blanket.

2 A. Well, you have to understand with sediments, we're dealing
3 with very very small concentrations, because the concern is
4 harm to those benthic organisms. So they have a much lower
5 threshold of impact. And the -- in this area where they were
6 working, and pretty much all of that area that was capped,
7 there was already sand there, so the sand is already on top of
8 the sediments, and you've got two-foot of sand separating this
9 very very lightly contaminated sediments. And then they put
10 down the armor lock, another eight inches of material with the
11 geotextile underneath it. So they're far removed from that.
12 And there's no risk of harm as they stand in the Cooper River,
13 other than what naturally exists in the Cooper River.

14 Q. So the river bottom, the original river bottom has some
15 level of tar sediment in it, or tar --

16 A. No tar, but just contaminated sediments that the benzene,
17 the polyaromatic hydrocarbons, those kinds of things. There
18 was no free-flowing tar like we see back on our site.

19 Q. So there's the dissolved phase that's in the sediments,
20 and is that at a high concentration or a low concentration?

21 A. Well, it's not dissolved phase, but there are contaminants
22 attached to the particles. So it's a very low concentration
23 compared to what would be considered source material.

24 Q. And then two feet of sand had been put down as a bed, and
25 the issue was how to stabilize or better secure that

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1 situation?

2 A. Yes, sir.

3 Q. And they were standing on top of that two feet of sand and
4 putting down that armor lock that would hold the sand down
5 better? Is that a fair description?

6 A. That's correct. But even in putting the block in, they
7 would stand on top of the sand blanket itself, which is not a
8 risk.

9 And they typically had the neoprene booties on, it would
10 be really kind of impractical for them to wear Tybek suits in
11 that kind of environment.

12 Q. Were there other actions where remediation was done on the
13 site where workers were more in contact with tar or impacted
14 soils where special suits or special clothing was worn?

15 A. Yes. We always had our contractors out there doing the
16 air monitoring, which was the key importance issue, and even
17 the breathing, that's considered a form of ingestion,
18 inhalation. But they also carried rubber gloves with them,
19 and if folks were working in contaminated soil, then they made
20 sure that they -- if they got it on them, number one, you get
21 it off, and then they would have those neoprene gloves, nitro
22 gloves, usually those blue ones that folks use.

23 So if they would do anything where they would physically
24 touch the soil, then that would need to be contained.

25 But even with wearing boots, if you were to get tar on

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1 your boots it would be no worse than, you know, getting tar
2 on, you know, that Tybek. As long as you managed that. And
3 it didn't touch your skin.

4 Q. So in terms of this overall issue of the extent to which
5 SCE&G worked to run a site that did take account of worker
6 safety and comply with the various requirements, what's your
7 testimony as to whether or not you believe you were compliant
8 or not?

9 A. We believe we were compliant. The health and safety plan
10 was something that we wrote, and we took a lot of -- a lot of
11 measures to make sure that it was adequately implemented.

12 Q. Mr. Bargren started to ask you yesterday some questions
13 relating to the \$26 million payment that was made to the City,
14 and your testimony to the PUC, and he referenced an exhibit
15 which -- Plaintiff's Exhibit 34, which as I understand it --
16 well, you're going to tell me. Plaintiff's Exhibit 34 is, as
17 I understand it, materials that the City of Charleston
18 provided you that included various numbers in their
19 calculation of what they had spent. Is that right?

20 A. What they were representing were their increased costs of
21 construction due to environmental issues. And so even at the
22 parking garage where we had done some work, they also did some
23 of the work that had some environmental measures that needed
24 to be implemented.

25 MR. FELMLY: So if we go over, Denise, to page two on

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1 this exhibit, which is Bates number 18091, and if you could
2 rotate that. And then if you could highlight it, rather, zoom
3 it up, if you would, please.

4 Q. You were indicating in your testimony yesterday, sir, that
5 I think you said originally their numbers were something like
6 \$40 million, and you had worked with them, and when you
7 testified to the PUC you had determined that you felt
8 30,000 --

9 A. 30 million.

10 Q. -- 30 million, rather, was appropriate?

11 A. Yeah.

12 Q. Is this the figures that you were examining and looking at
13 from the City where they had broken down the, as they call it,
14 the cost increases due to SCE&G contamination?

15 A. They gave me a whole stack of papers, so I looked through
16 it a lot. This does look familiar, I'm not sure if it's
17 exactly the same one.

18 Q. But in terms of numbers that we're looking at here, you
19 got these or SCE&G got these from the City?

20 MR. BARGREN: Objection, foundation.

21 THE COURT: Say what?

22 MR. BARGREN: Objection, foundation.

23 THE COURT: Well, I think he's already testified to
24 it, first of all. I don't think it's proper on redirect. I
25 mean, he said he got these documents, I recall telling you at

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1 that time that someone from the City had to come in and
2 testify, you said they were coming, so we're just rehashing
3 old evidence, and that's not appropriate on redirect.

4 MR. FELMLY: I just wanted -- actually I thought Mr.
5 Bargren had opened that further when he had cross-examined,
6 which is why I went back in.

7 THE COURT: I don't think so.

8 MR. FELMLY: All right. So you want me to hold
9 offering to mark these at this time until the City comes in?

10 THE COURT: That's what I thought we decided. I
11 mean, there's no reason to introduce them now, at a time when
12 the foundation is pretty sparse, when we have a man coming in
13 apparently that's going to be able to build that foundation
14 up.

15 MR. FELMLY: That's fine, Your Honor.

16 BY MR. FELMLY:

17 Q. Just a couple of final things then. With regard to the
18 information that you had and the goals and the directions that
19 you had from the EPA, after the first ROD, when you started
20 work in connection with OU-1 at the time in 1998 when that ROD
21 was indicated, did you have any information as to what the
22 plan would be for intermediate groundwater in 1998?

23 A. No, sir, I think it's pretty clear in there that we did
24 not. It was something else that needed additional study. It
25 was one of those issues that was -- that there was some

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1 vigorous discussion on between the agencies and with us. And
2 so there was no clear direction on intermediate groundwater.

3 Q. And as to the sediments, was that also in the category
4 where at that time after the first ROD, it was not indicated
5 to you what was going to be required?

6 A. Yes, it's pretty much the same answer there, they knew
7 that more study was required. They knew that they would have
8 to write a second ROD to determine an appropriate fix for
9 sediments in the Cooper River.

10 Q. And one last thing. In terms of this site and the cleanup
11 of this area, did SCE&G receive an award from the Southern Gas
12 Association for the cleanup of this site?

13 A. Yeah, the Southern Gas Association --

14 THE COURT: Let's don't go into something like that.

15 MR. FELMLY: Pardon?

16 THE COURT: That's not relevant.

17 MR. FELMLY: Well, I thought it was relevant because
18 I thought they were suggesting that my client was noncompliant
19 with respect to objectives and noncompliant --

20 THE COURT: The purpose is to convey a thought that
21 these people had. That's hearsay. That award constitutes an
22 assertion under Rule 801, and it's hearsay --

23 MR. FELMLY: I withdraw it.

24 THE COURT: -- first, and it might come under one of
25 the rules that prohibit character evidence. I often wondered

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1 just how far you can go with a witness in bringing out
2 character evidence, and I think this may fall within the
3 prohibited category.

4 MR. FELMLY: I'm not looking to test that then so
5 I'll withdraw it.

6 THE COURT: Okay.

7 MR. FELMLY: Thank you, I have nothing further.

8 MR. BARGREN: Nothing further.

9 THE COURT: Thank you, sir, you're excused.

10 Call your next witness.

11 MR. FELMLY: Your Honor, our next witness on behalf
12 of the plaintiff is Dr. Neil Shifrin, and I'd ask Dr. Shrifrin
13 to be called.

14 THE CLERK: State your full name.

15 A. Neil S. Shifrin.

16 NEIL SHIFRIN, a witness called by the plaintiff, first
17 having been duly sworn, testified as follows:

18 DIRECT EXAMINATION

19 BY MR. FELMLY:

20 Q. Good morning, Dr. Shifrin, could you please state your
21 full name and your professional address?

22 A. Neil S. Shifrin, Gradient Corporation, 20 University Road,
23 Cambridge, Massachusetts.

24 Q. And by whom are you employed?

25 A. Gradient Corporation.

NEIL SHIFRIN - DIRECT EXAMINATION

1 Q. And can you describe what your position at Gradient
2 Corporation is?

3 A. I'm a principal of the firm, focusing on environmental
4 engineering.

5 Q. And what is the business or the professional activities of
6 Gradient Corporation?

7 A. Gradient specializes in chemicals in the environment,
8 particularly the fate and transport of chemicals in the
9 environment, their transformations in the environment, and the
10 risks to people and ecosystems of chemicals in the
11 environment.

12 Q. About how large a company in terms of personnel employed
13 by Gradient is there?

14 A. About 85 people.

15 Q. And when and what year was Gradient formed?

16 A. 1985.

17 Q. And did you play some role or were you involved at the
18 time of the foundation of Gradient?

19 A. I founded the company with one other person.

20 Q. And the types of engagements that Gradient Corporation is
21 involved in, what does that consist of?

22 A. Really anything involving exposure to chemicals in the
23 environment, and how chemicals move from point A to point B.
24 Some examples of that would be superfund sites, dump sites,
25 disposal sites, MGP sites, factories. Other examples would be

NEIL SHIFRIN - DIRECT EXAMINATION

1 air exposures where a factory has a smoke stack and there
2 might be air exposures. Product safety, chemical exposures
3 due to use of everyday household products or consumer
4 products.

5 The types of cases that we work on are both purely
6 environmental cases where we design studies, data are
7 collected, we interpret the data, we perform risk assessments,
8 we model, mathematically model how chemicals are transported
9 in the environment.

10 We also work on litigation cases where there's a dispute
11 about whether there was an exposure, such as in toxic tort
12 cases. And we also work on a number of projects related to
13 historical operations; what were the waste releases, when did
14 they occur, and who might have been responsible for them.

15 Q. And in terms of the types of personnel or the skills or
16 the specialties of the personnel that Gradient has to work on
17 these problems, can you briefly describe to the Court what
18 types of technical abilities and scientific abilities these
19 folks have?

20 A. We have a number of toxicologists and health risk
21 assessment people. These are people who might have a degree
22 in public health or something like that. We have a number of
23 environmental engineers and environmental scientists, and we
24 have a number of chemists. That's pretty much the type of
25 people.

NEIL SHIFRIN - DIRECT EXAMINATION

1 Q. In your own case, what are -- what is your professional
2 training and background, which area or specialties do you have
3 training in, and then we'll discuss that some with the Court.

4 A. I'm an environmental engineer.

5 Q. And what is your educational background and what
6 educational degrees have you obtained in that regard?

7 A. I have a bachelor of science in chemical engineering from
8 the University of Pennsylvania, and a Ph.D. in environmental
9 and civil engineering from MIT.

10 Q. And in terms of your role with the company, what functions
11 or what types of activities do you personally have involvement
12 in on behalf of Gradient's clients or the people that hire
13 Gradient?

14 A. My practice area ranges from basic environmental
15 engineering, meaning being hired to evaluate chemical
16 contamination and its sources and how it's transported, its
17 fate in the environment. I also work on cases involving what
18 I call cost recovery, which might be insurance claims or PRP
19 disputes, potentially responsible party disputes within
20 superfund sites about costs, who shares the costs. And that's
21 an area that often is called cost allocation.

22 Q. Do you have any licenses or formal certifications in terms
23 of your areas of specialty?

24 A. I have a -- in Massachusetts, the hazardous waste program
25 is privatized and voluntary. And by privatization, what's

NEIL SHIFRIN - DIRECT EXAMINATION

1 meant is that some engineers are licensed to perform the
2 duties of the state in Massachusetts in terms of defining what
3 needs to be studied and what needs to be remediated. And I
4 have one of those, called a Licensed Site Professional.

5 Q. And in terms of your engineering experience, are you a --
6 are you an engineer?

7 A. I'm an engineer. I actually passed the eight-hour exam
8 for professional engineer license, but never took the oral
9 exam, because instead I went to graduate school and got my
10 Ph.D.

11 Q. So in terms of your Ph.D., that is in environmental civil
12 engineering?

13 A. The Ph.D. is in environmental engineering, and the
14 bachelor's degree is in chemical engineering.

15 Q. Can you summarize for the Court -- actually, one other
16 thing.

17 MR. FELMLY: Denise, if you could bring up Exhibit 36
18 just so we can identify this exhibit for the Court.

19 Q. You have provided and we have marked as an exhibit, Dr.
20 Shrifrin, your curriculum vitae in this matter, is that right,
21 which is a rather detailed description and goes on for a
22 number of pages. But this is the cover sheet of it, and is
23 this C.V. reasonably up to date and provide a summary of your
24 professional background and experience?

25 A. I believe so, yes.

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1 MR. FELMLY: Your Honor, we'd ask that the C.V. be
2 marked as a full exhibit.

3 THE COURT: Any objection?

4 MR. VARON: No objection.

5 THE COURT: Okay.

6 (Plaintiff's Exhibit 36 received.)

7 BY MR. FELMLY:

8 Q. What I'd like to do now, Dr. Shrifrin, is have you
9 describe in summary fashion for the Court the environmental
10 experience that you have had since your training and founding
11 the company, and in particular, with regard to matters that
12 would bear on pollution and contamination that may have
13 relevance to this case.

14 What was the areas where you got started in this area of
15 environmental science and the engineering aspects of it?

16 A. I have worked in -- as an environmental engineer for
17 almost 40 years now. I think it's 38 years, since 1971 when I
18 graduated from college. I started in the area of water
19 quality, and after graduate school I -- which was 1980, when I
20 graduated with my doctorate. I almost immediately started
21 working on Love Canal, which was one of the first hazardous
22 waste sites in the United States that was dealt with under
23 CERCLA, which was just then passed. I think CERCLA was passed
24 in December of 1979. I worked for about ten years on Love
25 Canal and three other landfills associated with the same

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1 company in Niagara Falls, where we literally blazed the trail
2 in terms of inventing, developing how to study hazardous waste
3 sites and how to remediate hazardous waste sites.

4 Since then, and during that time in parallel I've probably
5 worked on a couple of hundred hazardous waste sites throughout
6 the United States; a couple in other countries as well.

7 Focusing primarily on how to study sites, how to interpret the
8 data, how to develop what we call a site conceptual model,
9 which is a matter of describing where the contamination is,
10 what its sources are, where it's going, how it's getting
11 there, how fast it's getting there, the timing of the
12 contamination and all of those kinds of things. Sort of
13 getting to the psyche of the site in order to be in a position
14 to develop a remedy concept for the site.

15 Q. For how long a period of time have you been involved as a
16 scientist and as an engineer in connection with studying and
17 working with what we've been referring to in this case as NAPL
18 or DNAPL?

19 A. NAPL was one of the first things I worked on when I got
20 out of graduate school in 1981. I actually performed some of
21 the initial experiments that later became the basic
22 understanding of NAPL migration. So I've been working on NAPL
23 since probably 1981.

24 Q. And in addition to NAPL, if you can just give the Court a
25 brief understanding of the other types of contaminants or the

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1 other major types of contaminants that you've worked with in
2 dealing with various industries or manufacturing operations?

3 A. I've really worked with almost every kind of contaminant
4 that you can imagine. If you break it down into the way EPA
5 breaks down chemical analysis of environmental samples, there
6 are volatile contaminants, there are semi-volatile
7 contaminants, those are organic chemicals such as benzene
8 would be a volatile contaminant, and polyaromatic hydrocarbons
9 would be a semi-volatile organic contaminant.

10 There are trace metals; I've worked with numerous
11 different trace metals. And there are pesticides and special
12 chemicals, I'd call them, such as PCBs, dioxins, and some what
13 we call very highly bioaccumulative compounds.

14 Q. And in all this work that you've worked on over the years,
15 to what extent have you had to interact with the various
16 agencies that regulate environmental matters, such as the EPA
17 or the state agencies in the various jurisdictions where
18 you've worked?

19 A. I've worked with federal agencies and state agencies very
20 closely within the hazardous waste field since 1980. Really
21 on both sides. I was a consultant to the Justice Department
22 and the U.S. EPA, both headquarters in region two for the
23 Niagara Falls sites, Love Canal. And after that and during
24 that I worked for various industries where we had to interact
25 with the agencies to get studies approved and work plans

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1 approved and remedy concepts approved.

2 Q. Have you had experience, Dr. Shrifrin, in connection with
3 working on the environmental risks and the circumstances of
4 manufactured gas plants?

5 A. Yes. I've worked on about 130 MGPs.

6 Q. Over what period of years has that body of work taken
7 place?

8 A. I've worked on MGPs probably for about 20 years.

9 MR. FELMLY: And, Denise, if you could bring up
10 Exhibit 74.

11 Q. Have you prepared -- just under the issue of
12 qualifications, the -- a chart that shows the number of areas
13 of the country where you have worked on MGPs?

14 A. Yes.

15 Q. And if you could go to that. What I'm showing on the
16 monitor here, just to get a sense as to, you know, the over --
17 I guess the breadth of your work in that area, does this
18 description showing your MGP experience identify the regions
19 and areas where you have had sites, and the approximate number
20 of sites that you've worked on in those places?

21 A. Yes, I've worked at MGPs literally everywhere in the
22 country.

23 MR. FELMLY: Your Honor, this is actually a portion
24 of another sort of composite exhibit. As to this page I would
25 ask that the exhibit be marked as a full exhibit for the

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1 benefit of the Court, and we would submark it as 74(4) or (5)
2 or A or B.

3 THE COURT: Any objection?

4 MR. VARON: I don't have any objection to the page,
5 Your Honor; I might have objection to other parts of the
6 exhibit. I'd have to look through.

7 MR. FELMLY: As to this document you have no
8 objection?

9 MR. VARON: No.

10 THE COURT: This is the only one you're offering?

11 MR. FELMLY: There are others that will be coming
12 along.

13 THE COURT: Right now?

14 MR. FELMLY: Right now.

15 THE COURT: No objection to this?

16 MR. VARON: Correct, Your Honor.

17 THE COURT: Okay.

18 (Plaintiff's Exhibit 74-A received.)

19 MR. FELMLY: Just on that, Your Honor, if I, may,
20 what I'm going to do is avoid the issue we had this morning,
21 is to pick areas where I think there is no objection and to
22 try to avoid the issues that we raised, and I'll be doing --
23 we'll catch up on the numbering.

24 BY MR. FELMLY:

25 Q. In terms of the well over 100 sites that you've worked on,

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1 what types of roles or what types of tasks and
2 responsibilities, Dr. Shrifrin, have you had with regard to
3 those sites?

4 A. I've had purely environmental roles, meaning I've helped
5 design studies and remedies, oversaw the risk assessments.
6 And then I have worked on insurance claims where utilities are
7 suing their insurance companies to reclaim their costs under
8 their general comprehensive liability policies. And I've
9 worked on cost allocations where responsible parties have a
10 dispute about whether or how to share the costs of the studies
11 and cleanup.

12 Q. And in terms of the areas where you actually were involved
13 in the cleanup or the remediation, as opposed to providing
14 consulting to people in an insurance dispute or some other
15 legal dispute, what types of roles have you played that dealt
16 with actual remediation of these sites?

17 A. What types of roles?

18 Q. Yes.

19 A. I have designed studies where to put the soil borings and
20 the wells and what to sample for, what to look for, how many
21 to put in. I have developed remedy concepts. I and Gradient
22 don't actually perform remediation, so when I say remedy
23 concepts, I've developed how a site should be remediated, in
24 other words, a cap or a soil excavation and where the soil
25 should be excavated and things like that, but not actually the

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1 nuts and bolts design of how one would actually go and do
2 that.

3 I have overseen and designed the risk assessments for
4 sites. That's pretty much soup to nuts, except for digging
5 the dirt.

6 Q. In connection with your work as a consultant with regard
7 to the legal side of these cases, both on the insurance side
8 or cost recovery, have you had occasion to serve as an expert
9 and provide testimony in these cases in various court
10 proceedings?

11 A. Yes.

12 Q. And also in deposition?

13 A. Right.

14 Q. And have you provided both in your report and have we got
15 a listing of the cases where you have provided testimony in
16 connection with matters involving MGPs?

17 A. Yes.

18 MR. FELMLY: And, Denise, if you could bring up or
19 click further into this Exhibit 74 to that, keep going past
20 that and just --

21 Q. What is now appearing on the monitor, is that a listing of
22 MGP or cases related to MGP where you have given either
23 deposition or court testimony?

24 A. Yeah, I can't be absolutely certain that it's complete. I
25 may have missed some, but this is pretty much complete.

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1 Q. And as a consequence of that, it would appear that you've
2 given testimony in New Hampshire and in Massachusetts, Maine
3 and New York, is that correct?

4 A. Right.

5 MR. FELMLY: We would offer this summary chart as a
6 further subexhibit; we'll mark it as a portion of Exhibit 74.

7 MR. VARON: No objection to the sheet, Your Honor.

8 THE COURT: Without objection.

9 (Plaintiff's Exhibit 74-B received.)

10 BY MR. FELMLY:

11 Q. What I'd like to do, Dr. Shrifrin, now, is ask you about
12 your exposure or prior dealings in connection with the
13 defendant in this case, UGI, and investigations you've made on
14 that. Can you explain to the Court what work or research you
15 have done with regard to UGI, which is the defendant in this
16 case, and as we know, was a company involved with manufactured
17 gas plants.

18 A. My initial experience with UGI started with my experience
19 with manufactured gas plants. I've read probably over 1500
20 technical papers, historical papers about manufactured gas,
21 gas manufacturing, the various angles of that. And through
22 all that research, which has occurred over maybe ten or 15
23 years, I came across UGI and UGI's activities often.

24 My first focus study of UGI was on the -- at the
25 Manchester Gas case in Manchester, New Hampshire, where then

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1 current owner was suing UGI as a responsible party to
2 participate in the costs of the response.

3 At that point I dove in pretty head first in terms of
4 reviewing UGI's background, their equipment, reading UGI's own
5 histories, their descriptions of themselves, their board of
6 directors' minutes and things like that. And studied UGI very
7 intensively for that engagement.

8 Since then I have --

9 Q. Before you move on from that, in that case did you
10 actually provide testimony in court in that trial?

11 A. Yes, I did.

12 Q. And since that case what other involvement have you had
13 where you've had forensic or legal cases where you have
14 provided opinions regarding UGI's role?

15 A. Since that case, and in addition to this case, I've worked
16 on another case in Connecticut involving 13 manufactured gas
17 plants throughout the state, where UGI had various roles in
18 ownership positions.

19 I also peripherally worked on a case in St. Augustine,
20 Florida, where UGI had an ownership period.

21 Q. What in the St. Augustine, Florida case, what was the
22 engagement or the role that you were involved in, what purpose
23 were you providing information for the benefit of the Court?

24 A. Although I didn't perform it, the purpose was for cost
25 allocation between UGI and other -- among all the parties,

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1 actually. What I was asked to do was to come up with a
2 reasonable basis for an allocation of just for time periods.

3 Q. In terms of studying UGI and its role with respect to
4 MGPs, and in particular the role that it had or didn't have
5 with respect to controlling the operating activities of MGPs,
6 how has your experience or your training, in your view,
7 brought to bear or what is it about your training and
8 experience that you think is helpful in that application?

9 A. Well, first I think you need to be an engineer to
10 understand the engineering aspects of plant like a
11 manufactured gas plant. Because it really is a complex
12 chemical plant. It's -- it might look simple on a map or a
13 Sanborn map or something like that, but it's -- it's both an
14 art and a science and an engineering element to it that's very
15 complex. So having an engineering background allows me to
16 read about MGPs in the technical literature and understand
17 what the issues are for both gas making and by-product
18 management.

19 In addition to that, having a background in the
20 manufactured gas industry allows me to both understand the
21 nature of the Charleston plant in relation to the industry in
22 general, as well as the relationship of UGI to this plant. I
23 don't think without an understanding of the manufactured gas
24 industry, one could understand properly UGI's role at this
25 plant and the operations at this plant.

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1 Q. Well, what do you mean by that? What is it about UGI and
2 its historic role with respect to that industry or those
3 plants that would be important in putting that in context, if
4 we were to go back to look at a period from, say 1910 to '26
5 that's involved here?

6 A. I think you have to have a background on how a plant like
7 this operates, how the industry operated, to understand
8 whether or not UGI operated this plant.

9 Q. And what was it about UGI's role or its position in that
10 industry that is important in that examination that you're
11 making?

12 A. UGI had absolute understanding of gas making. They were a
13 leader in the field, they were pervasive in the field. They
14 held major patents for equipment, they had a construction
15 first division, then a construction company that built gas
16 plants. Their people within their -- their executive
17 organization understood the gas business totally. They had
18 departments and were organized such that they were able to
19 understand all elements of gas making, residuals management,
20 residuals generation, gas generation, raw materials
21 purchasing.

22 And they had a training program where they staffed plants
23 throughout the United States, their cadet program, where not
24 only did they staff plants -- people -- plants with people,
25 and not only did they bring people up in their careers by

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1 transferring them throughout plants, but they actually
2 participated in university programs that actually trained the
3 engineers in engineering school to then graduate and come into
4 the UGI program.

5 So their ability to run a plant was absolute and
6 pervasive. They understood plants totally.

7 Q. When you say they held patents, are you familiar in your
8 study and understanding, do you -- are you familiar with the
9 process which UGI acquired a patent interest in?

10 A. The very founding of UGI in, I think it was 1882, was
11 around Lowe's invention of his version of the carbureted water
12 gas process, which is referred to still today as the Lowe
13 process. That's L-O-W-E.

14 And I believe Lowe was one of the founders of UGI. UGI, I
15 don't know the details of it, but UGI became the owner of
16 the -- of Lowe's patent for the carbureted water gas process,
17 and then proceeded to install several hundred carbureted water
18 gas site sets throughout the country.

19 Q. And we'll get into what carbureted water gas is later in
20 your examination, but this was a new way of making gas?

21 A. Yes. Versions of it had been around for probably about
22 ten years earlier, but prior to this, gas was made by
23 pyrolizing coal, which means to heat coal at a very high temp
24 in the absence of oxygen, so it doesn't burn, and instead of
25 burning, it vaporizes and makes gas.

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1 And the carbureted water gas process diverged from that by
2 heating coke and spraying steam on it, and then spraying
3 petroleum on that to make a slightly different form of gas.

4 Q. And again, not going into all of the details, but what was
5 the advantage of the -- in terms of the quality of the gas or
6 what it did when the consumer used it, what was the
7 achievement that came from the new process?

8 A. There were really two advantages to the new process.
9 First, it could be started up and shut down very quickly. And
10 so it was very useful in terms of supplementing coal gas
11 operations.

12 A coal retort, on the other hand, really should never be
13 shut down, because it would crack and break. So once you
14 start up a coal gas retort, it -- basically you run it until
15 it's time to replace it. Whereas a carbureted water gas
16 process you could really shut down and start up over maybe a
17 24, 48-hour period. So that was a real advance and a very big
18 advantage in terms of peak loading and being able to add more
19 gas during the day when people were using it and during the
20 winter when people needed it more.

21 The other advantage of carbureted water gas was it had a
22 higher candlepower. Initially in the manufactured gas
23 industry, lighting was a very big portion of gas sales. After
24 the electric light became popular around 1905, 1910, it was
25 more gas was used for heat. But initially gas was used

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1 primarily for light. So candlepower was very important.

2 And carbureted water gas had slightly higher candlepower
3 in general than coal gas, and so it was preferred for
4 lighting.

5 Q. Now, as a result of the work you had on these prior UGI
6 cases, can you describe for the Court the extent to which
7 you've become familiar with the UGI history and the structure
8 and the documents, what have you learned by reason before you
9 really even opened the first --

10 THE COURT: Yes, sir?

11 MR. VARON: Your Honor, I guess I have an objection
12 to -- I think Mr. Felmly is trying to qualify Mr. Shifrin as
13 an expert in UGI, because he has read corporate minutes,
14 looked at corporate records in the past, served as an expert
15 witness. And I don't think that's a proper foundation for him
16 testifying about UGI's business methods and the way it
17 supposedly ran itself. He's read some things, he's not versed
18 as a -- as somebody who has studied history, he's not a
19 corporate governance guy, he doesn't study parent-sub
20 relationships, doesn't know anything about human relations and
21 employees, so I think I object.

22 MR. FELMLY: May I be heard?

23 THE COURT: We discussed this testimony before, and I
24 view it a little differently in a nonjury case than I would in
25 a jury case. If we had a jury sitting over there I would have

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1 certainly had a Daubert hearing, probably had the witness
2 testify at that hearing so I could hear his testimony and make
3 a ruling that I thought was appropriate under Daubert and
4 cases that followed it. Nonjury I treat it a little
5 differently.

6 I have serious reservations about his qualifications. If
7 he had an LLB degree or an MBA, then I think he'd be closer to
8 being in the area where he needs to evaluate this evidence
9 that he has.

10 He says that being a chemical engineer is important in
11 understanding the gas business. I don't deny him that. But
12 that's an entirely different thing, it seems to me, from
13 understanding and explaining and giving meaning to the
14 business operations of UGI.

15 But let me hear him, and I really don't think that -- not
16 only do I not think his qualifications are broad enough, that
17 deals with reliability under Kumho Tire and those cases.

18 I'm of the initial impression that his testimony is not
19 relevant under those cases, because it has to qualify under
20 Rule 702 as something that will assist the trier of fact. And
21 it's fundamental that to assist the trier of fact, he has to
22 be in a better position to interpret these documents than the
23 trier of fact, and I do not concede that position to him yet.
24 But I'm going to hear his testimony. I may rush it up a
25 little bit and not let it drag out for two or three days, but

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1 I want to hear it, but I hear it with the reservations that
2 I've expressed, and I hear it under the rule that the Fourth
3 Circuit has, I think, adopted in order to give us an
4 opportunity in nonjury cases to hear most of the evidence, and
5 then to make a ruling based thereon, make a ruling based on
6 what appropriately comes before the Court.

7 MR. VARON: Understood.

8 THE COURT: I think the reason for that ruling is not
9 only to give us a little bit of an advantage, but they don't
10 normally give us an advantage, so I don't think that's the
11 real basis of it. The real basis is because of the scope of
12 their review in a nonjury case, they want to see all the
13 evidence themselves. They basically want to retry the case.
14 And I think that's why the rule exists. But be that as it
15 may, it's there, and I'm going to take advantage of it. So
16 your objection is noted. We can argue it again and probably
17 will argue it again and again and again, but I've stated my
18 reservations, now we'll hear it and see where we go.

19 MR. VARON: Understood, Your Honor. I'm going to
20 have a few other objections.

21 THE COURT: You can object any time you want to.

22 MR. VARON: I'll state them briefly and we can go on.
23 Thank you.

24 THE COURT: I didn't call on you to argue, because I
25 really don't think it's necessary. We discussed it, I've been

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1 into it enough to think I know what the plaintiff's position
2 is and what I think the defendant's position is. But if you'd
3 like to state anything for the record, I'd be happy to let you
4 do it.

5 MR. FELMLY: I don't need to do it now, Your Honor.
6 My approach will be to develop the evidence and hopefully set
7 it forth in a way that it is helpful for you.

8 THE COURT: And it's a moving target. I haven't made
9 up my mind.

10 MR. FELMLY: I will say this. I'm not trying to
11 qualify Dr. Shrifrin to make either legal decisions for you
12 or -- certainly not that, nor business decisions, but to focus
13 on the issue in Bestfoods of the operational day-to-day work
14 of the plant, how it works, and how UGI impacted and that's
15 going to be my focus.

16 THE COURT: Let's see where it goes.

17 MR. FELMLY: Thank you, Your Honor.

18 BY MR. FELMLY:

19 Q. Let me move right to that, Dr. Shrifrin. In terms of the
20 engagement or the job, if you will, that you were asked to
21 undertake in this case, can you describe for the Court the way
22 in which your background and expertise has been developed or
23 is being applied, and what it is that you are providing
24 information and opinions on. What is the work and the
25 questions that you are examining?

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1 A. I'm examining the plant operations in very distinctly not
2 the business element of the relationship between UGI and the
3 Charleston plant, but specifically the operational elements
4 between those two parties.

5 To do that, my methodology really had two steps. First, I
6 elaborated the history of the plant itself, when the plant
7 existed, what it made, its production volume, its by-products,
8 its equipment, and how that evolved from time.

9 Now, this plant operated for a little over 100 years, so
10 it had -- has a tremendous history in that area.

11 As part of that historical element of the plant, I also
12 identified and elaborated the -- who operated the plant, more
13 so than the owners, although I'm aware of the ownership of the
14 plant. Who operated the plant, how the plant was operated,
15 how the plant's operations were corrected through that period
16 of time.

17 That's the first part of my methodology. And the outcome
18 of that is answering the question, which pieces of equipment
19 and which types of operations were related to which party
20 during the hundred so odd years of operations.

21 Putting that aside, then the second thing that I did in
22 this case was evaluate the environmental contamination. The
23 tar contamination, the soil contamination, the groundwater
24 contamination, and related that contamination to the
25 operations of the plant. And more specifically, to the

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1 specific equipment in the plant, such as the tar tanks, the
2 gas holders, generator house, the retort house, the tar
3 loading station and things like that.

4 Then creating the relationship between the type of
5 contamination and the location of the contamination, while
6 recognizing that some of this contamination can migrate, so
7 where we see it today might not be where it was a hundred
8 years ago.

9 I then related that contamination to the equipment, and
10 then brought the prior piece together and related the
11 contamination to the operations and to the parties who
12 operated the equipment.

13 Q. And in terms of performing that inquiry, what is the types
14 of information and the data that you utilized in order to make
15 that assessment and to make those linkages or those
16 connections you've described?

17 A. For the first part of the method, the elaboration of the
18 plant history, I evaluated a number of records that were local
19 to the plant, such as the CCR&L directors' minutes, accounting
20 ledgers, old Sanborn maps. Mr. Effinger mentioned what those
21 were yesterday. The Sanborn Fire Insurance Company mapped
22 literally the United States from the late 1800s to maybe even
23 currently, I don't know, but maybe every ten years they would
24 go back and visit the same site. And so we've been able to
25 put together a number of Sanborn maps that indicate at that

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1 point in time what this plant looked like, such as in 1880 and
2 1905 and a few years beyond that.

3 We have engineering drawings where engineers drew
4 footprints of the plant, all the equipment, all the piping.
5 We have company histories. There are company histories of the
6 Charleston plant, there are company histories of UGI. I think
7 I mentioned accounting ledgers. Newspaper, contemporaneous
8 newspaper articles. And also MGP literature. There were
9 several journals published at the time. There was the
10 American Gas Association, a number of other trade associations
11 that had information about the plants, even this plant, but
12 other plants, of course. All of that material was my source
13 material to cobble together the history of the plant.

14 Q. And in terms of UGI's role or what UGI was doing at any
15 particular time or the role that it played on a particular
16 plant operation, to what extent were you able to glean or
17 identify that information in that body of data that you've
18 just described for the Court?

19 A. There's quite a bit of information in the UGI material,
20 such as the UGI board minutes, the board maintained minutes
21 for its executive committee, its operations committee, its
22 management committee, its operations and management committee.
23 These were various board committees that existed through
24 various points in time within the period of time that UGI
25 owned the Charleston plant.

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1 And in those minutes are reflected very specific,
2 unbelievably specific detail in terms of operational control.
3 Such as authorizing staff transfers, authorizing budgets,
4 authorizing -- and I'm talking about not accounting budgets,
5 but I'm talking about budgets to buy equipment, to install
6 equipment and to run operations.

7 THE COURT: Yes, sir.

8 MR. VARON: Your Honor, just to preserve my
9 objection, another basis on which we object to
10 Mr. Shifrin's -- Dr. Shrifrin's testimony, and this is set out
11 in the Daubert motion, is that he appears to be using a
12 concept called operational control. I don't think it's
13 defined anywhere, I don't think it's accepted anywhere, and I
14 think it is essentially a definition that he has made up to
15 include what he would like. I think in all the cases I've
16 seen, it's mentioned once in passing without having been
17 defined. Bestfoods has a standard of managing and conducting
18 disposal of waste. This case is about different standard of
19 operational control that has no meaning. So we have a -- I
20 guess a continuing objection to testimony that would say this
21 is operational control or that is operational control, both on
22 relevancy, foundation, reliability and improper expert
23 testimony, everything. Thank you.

24 MR. FELMLY: Do I need to respond to that, Your
25 Honor? Or I can do it --

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1 THE COURT: Well, the witness has talked in plain
2 English. I mean, he hasn't used any technical terms that I
3 don't understand, I mean, he's just saying what he's found in
4 these minutes and all.

5 MR. FELMLY: I'm going to move on then.

6 BY MR. FELMLY:

7 Q. You understand, Dr. --

8 THE COURT: I assume he's going to express an opinion
9 based upon that information. You know, it's gotten to be
10 fashionable in presenting expert testimony to follow Rule 705,
11 and have witnesses express opinions before they give you the
12 data and facts upon which they rely. But that rule also
13 provides that if the Court requires, then you have to give the
14 data up front. I think in this particular case it would be
15 very helpful to me, and I think it would let us kind of sort
16 this thing out, and I say sort it out because there's such a
17 volume of documentation here, that it's going to be almost
18 impossible for me to do it by myself. And if it's practicable
19 for him to express an opinion, and then to state the data and
20 information upon which he bases that opinion, he may be
21 talking about corporate control or whatever terminology he
22 used, but I'd like to know what he's talking about, and I'd
23 like to know what he relies on to do that.

24 And seems to me that kind of makes it easier for me. And
25 one of the toughest jobs I ever learned as a trial lawyer was

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1 taking an expert's opinion and digesting it and put it down on
2 the level to where I could feed it to a jury. And that's a
3 very difficult thing, in particular in a case as complicated
4 as this, and it seems like that framework that I've outlined
5 might do that for me. But you try your case the way you want
6 to.

7 MR. FELMLY: No, I will try to do that. I will tell
8 you the next page says, can you give us a summary of your
9 opinions, and I'm going to take that page aside and hold it
10 and we'll do it more in the way I was doing it when I started.

11 THE COURT: No, I'd like to hear his opinions, then
12 I'd like to hear what he bases them on.

13 MR. FELMLY: What I was going to say is --

14 THE COURT: If that doesn't disrupt --

15 MR. FELMLY: Doesn't disrupt it, but I want you to
16 understand, Your Honor, what -- I mean, I have an outline that
17 will take us some time, and I will move through it as quickly.
18 But I think that in light of what you've said, and there's so
19 many different areas he's going to speak on, I think I will
20 develop the opinions and then present the detailed evidence as
21 I go along, rather than to give you an overview now. He could
22 do that and give a sort of a preface to it as to where it's
23 going to go, but I'll do it more traditionally.

24 THE COURT: Okay.

25 BY MR. FELMLY:

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1 Q. What I want to be clear on and make sure though, Dr.
2 Shrifrin, when you talk about looking at board of directors'
3 minutes or various corporate documents of the company, of UGI
4 or of the subsidiary here, to what extent are you examining
5 matters that relate to how the manufactured gas plant is
6 operated and run on a day-to-day basis, as opposed to things
7 of a more general business nature, because frankly we're not
8 calling you as a business witness.

9 A. That's right, it's the former. I'm looking at the
10 minutes, the board minutes not in terms of business control.
11 And all I meant by this term, operational control or
12 engineering control, is not business control. That's all I
13 meant by that term. I didn't mean to coin a term, I didn't
14 mean to refer to an existing set of academic understanding.
15 All I meant was that my discussion is not business control.
16 So when I'm looking at board minutes, I'm looking for evidence
17 of operational control of issues that relate to the actual
18 operations of the plant, not an owner being an owner.

19 In other words, an analogy might be you can be an investor
20 in a race horse and know nothing about horses, and you can't
21 train that horse. But if you understand horses and happen to
22 be an investor, you could actually participate in the training
23 of that horse.

24 That's what I'm talking about, is the training of the
25 horse. The actual plant operations. And I didn't mean to

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1 coin a term, and I'm not trying to coin a term, I just mean
2 not business.

3 Q. Let me ask it this way. In language that UGI has cited
4 and in language that Bestfoods does talk about, although
5 operations are mentioned in Bestfoods, issues of management,
6 direction or control of the actual processes that are related
7 to the pollutions discussed, is that a focus or the focus of
8 your work?

9 A. That's right. And actually that phrase in Bestfoods says
10 manage, direct or conduct operations related to the leakage or
11 disposal of pollution.

12 Q. Is that the area that you're talking about?

13 A. That's the area I'm talking about.

14 Q. All right. Let's start talking about the Charleston MGP,
15 and we'll develop the opinions as we go forward.

16 First of all, with respect to your area of inquiry and
17 trying to understand the way in which UGI's role in the plant,
18 from your perspective, is important --

19 MR. FELMLY: Let's first of all, Denise, if you could
20 bring up the aerial photo of the plant so we can get the
21 description back up in front of us and understand what we're
22 exactly talking about. And I'm particularly talking about the
23 ROD site photo. That's a portion of Exhibit 78, and this has
24 been used previously yet with Mr. Effinger.

25 Q. First of all, in terms of this aerial photo on which

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1 information has been superimposed, can you describe, Dr.
2 Shrifrin, what the relevance of this is in terms of coming to
3 an understanding of the site, particularly as it related to
4 UGI's operations?

5 A. From an environmental standpoint first, the dark green and
6 the crosshatched green is the way the ROD defines the site.
7 So everything that you see outlined here down to here and
8 around here, that's the EPA's definition of this superfund
9 site. So anything within this is either a source area or an
10 impact area, and any party that owns or operates anything
11 within this area is potentially liable under CERCLA.

12 Q. In terms of which portion of that was actually the area
13 where the MGP work --

14 A. The MGP was basically in this area here. Now, currently
15 the electrical substation, and formerly mostly the MGP, there
16 was a steam plant that UGI built here that supplied steam to
17 the carbureted water gas process and other elements over here,
18 but basically the MGP was in this area here.

19 Q. And in terms of the areas that are broader than that, how
20 have they been affected, or what's the general mechanism of
21 what happened in terms of the contamination, so that we end up
22 with an area larger than the original MGP site?

23 A. The MGP had many pieces of equipment, such as tanks and
24 manufacturing areas and everything. And it leaked tar through
25 a very long period of time. The tar migrated as well as the

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1 tar contaminating the groundwater. The tar migrated down into
2 this area, and in this area, and over to here to some extent.

3 In addition, the tar created groundwater contamination
4 which moved both in this area to the Calhoun Street drain
5 which discharged to the river, as well as to the river
6 directly. I can draw an arrow there.

7 Then of course there's soil contamination as well. So the
8 main problems from the MGP were tar contamination being a
9 source in itself, being a contaminant in itself, a -- really a
10 mixture of different chemicals, and then that being a source
11 to create groundwater contamination as well as soil
12 contamination, which is -- think of it as dirty soil that
13 doesn't quite have tar in it, but for various reasons became
14 contaminated.

15 MR. FELMLY: If we get to -- can you go, Denise, to
16 the historic picture that you had up there.

17 These -- there are three photos we saw earlier. Are you
18 familiar with these photographs that -- this photograph that
19 I'm displaying here?

20 A. Yes. I think Mr. Effinger showed these yesterday and said
21 these were taken in 1911, which is a year after UGI built
22 the -- rebuilt the plant.

23 Q. And in terms of the labels on them, is that labeling that
24 you've placed on it based on your familiarity with
25 manufactured gas plants?

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1 A. Yes.

2 Q. And in terms of orienting the Court to the major
3 structures that are on an MGP, and their functions, can you
4 describe for us what some of these major portions that you've
5 labeled are, and generally how they are a part of the MGP
6 daily operation process?

7 A. From 1910 onward, with a couple of exceptions, gas was
8 made in this building here called the generator house. That
9 gas then went initially to the -- sorry -- to the relief
10 holder, which is this item here. And then to a series of
11 processes which I will explain later, to purify the gas. And
12 ultimately stored in this unit here, which is the -- what's
13 called the City holder or the gas holder, the main gas holder.
14 From there, gas was distributed to the City of Charleston.

15 Q. And in terms of the area in the foreground, the coal shed
16 and the coke shed, they served the purpose of what, storing
17 the fuel?

18 A. The fuel -- carbureted water gas was made from coke and
19 from oil. And so the coke shed stored the primary fuel for
20 the generation of gas, and the oil tank, for example, stored
21 the secondary fuel for the generation of gas.

22 Coal, on the other hand, was used in coal gas
23 manufacturing. And when the retort house was in operation,
24 that would be the main fuel raw material for the coal gas
25 manufacture.

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1 Q. There's a reference to tar tanks in this photograph.
2 What, in the context of an operating manufactured gas plant do
3 the tar tanks, what purpose do they serve?

4 A. You can't make gas without making tar. Tar is an
5 intrinsic by-product of the gas manufacturing process. And
6 was actually a very valuable commodity, even though it might
7 be viewed as waste in some cases, the value of tar through
8 early history, particularly was more valuable than coal. So
9 gas plants typically went to great lengths to recover the tar
10 that was the by-product of gas manufacture. And in any
11 manufactured gas plant you'll see tanks all over the plant
12 where they're storing the tar before they either distill it
13 themselves into products, or sell it to a distiller. And you
14 often take it off by railroad train.

15 Q. In this photograph in 1911 or thereabouts, are you able to
16 determine whether the plant has been rebuilt after UGI has
17 come on the scene in 1910?

18 A. Yeah, but -- yes. This is definitely after UGI, because
19 the generator house is present, which is something that UGI
20 built. And the relief holder and the tar tanks are present.
21 All those are pieces of equipment that UGI built.

22 Q. Now, what happened in terms of the construction or the
23 changes physically in the plant in 1910? What was done with
24 the old plant, and at least in general terms, what was done in
25 terms of createing a new plant?

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1 A. Parts of the old plant were demolished, and the new plant,
2 consisting of the generator house, the relief holder, the
3 tanks and some condensers and other pieces of equipment were
4 built by UGI in 1910. And I believe started up in November of
5 1910 as a carbureted water gas plant.

6 MR. VARON: Your Honor, again I beg your pardon, I
7 just want to make it clear that, you know, the assertion that
8 UGI built the plant is something that we contest. I think
9 it's not necessarily an engineering issue, it's an issue of
10 corporate function. There was a subsidiary here that built
11 the plant, UGI financed it, UGI owned the company that built
12 it, but we take exception with that and I just want to let you
13 know where we are on this. I assume I'll have a full
14 opportunity to cross on this. But these are the kinds of
15 questions I have concerns about, because this requires no
16 engineering expertise to determine who built the plant; it's a
17 matter of corporate responsibility. Thank you.

18 MR. FELMLY: Your Honor, I'm not going to respond to
19 all that, but just from the point of view of objections, and
20 however you want to do it, but it seems to me that if
21 Mr. Varon is going to make speaking argumentative objections
22 as we go through at every point, I mean, I can go back and
23 start getting the exhibit that will respond to him. But it
24 does seem to me that it's not proper objection format for him
25 to punctuate the evidence. If he has an objection to the

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1 evidence, he ought to make it, you can rule, but I don't -- I
2 mean, I could give him a rhetoric and we could go back and
3 forth. I don't want to do that particularly.

4 THE COURT: I didn't follow him 100 percent with his
5 objection, but it seemed to me that the vast majority, if not
6 everything he objected to, can be covered by
7 cross-examination.

8 MR. FELMLY: That would be my point.

9 THE COURT: Yes, sir.

10 MR. VARON: That's fine, Your Honor.

11 BY MR. FELMLY:

12 Q. What I'd like to do now is to --

13 THE COURT: But, that being said, I alluded to
14 Rule 705, and of course I'm not sure that this is an opinion
15 that this witness has expressed. But it seems to me he is
16 expressing an opinion that UGI built these various facilities.
17 And I think that the defendant, if they made this objection,
18 they could make an objection requiring or asking the Court to
19 require that the witness state the data and facts upon which
20 he bases that opinion. And if they made that request, I would
21 make him do it. And so it seems to me I can interpret the
22 objection as that and require you to show what facts and data,
23 under Rule 705, he relies in expressing that opinion.

24 MR. FELMLY: And this box with these various
25 stickies, which I'm -- in this planned direct examination

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1 which will, you know, discuss these points, would go through
2 and put in the various statements that were made, the minutes,
3 the things that indicated that in 1910 when UGI came to town,
4 it was involved in the rebuilding of the plant, installing the
5 Lowe process. If he's saying they hired --

6 THE COURT: That's not what he said. He didn't say
7 they were involved in it, he said they built it.

8 MR. FELMLY: And we believe they built it. We
9 believe they designed it, they built it. Mr. Waring, who was
10 brought in from Omaha, we can debate whether Mr. Waring was --

11 THE COURT: Let's just ask the witness what he bases
12 that upon.

13 BY MR. FELMLY:

14 Q. You made the statement that the UGI company was the
15 company that rebuilt the plant in 1910. What's the basis or
16 the factors that go into that opinion, Dr. Shrifrin?

17 A. There's a number of bases. First, UGI's express strategy,
18 by their own words, was that their strategy to install
19 carbureted water gas plants throughout the United States was
20 to first buy the company and then get the company to build
21 these plants.

22 But there's a layer deeper than that, and that layer is
23 reflected in the minutes of the UGI board, where the UGI
24 board, it's very clear the executive committee, that UGI
25 transferred George Waring from the Omaha plant, where he was

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1 working for UGI in the Omaha plant, transferred Waring to
2 Charleston in order to build this plant.

3 THE COURT: Is he a native of Charleston?

4 A. He was not a native of Charleston.

5 THE COURT: That's a very prominent name in
6 Charleston, Waring.

7 A. Is it? But the newspaper in the Charleston newspaper at
8 the time, were very clear saying George Waring's coming to
9 town and UGI brought him to town and he's designing the plant.
10 And Waring is quoted as saying in the newspaper, we have
11 infinite resources to rebuild this plant. Waring was a UGI
12 employee. He was transferred by UGI. There's UGI minutes,
13 board minutes that reflect that, that he was transferred
14 there.

15 The fact that he became a local employee doesn't matter,
16 because he was placed there by UGI, UGI's minutes reflect
17 that. He was in charge of designing the plant and building
18 the plant. And later, when he left in 1917, there are UGI
19 Circle monthly newsletters, there are newspaper articles that
20 reflect Waring as a UGI employee.

21 I think it's irrelevant or it's superficial that he was
22 actually a CCR&L employee, because that's how the parent dealt
23 with the subsidiary and their employees.

24 There's other evidence. If it was just one person, I
25 would say that might be an exception and you can't really base

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1 it on that. But there's a string of people, there's like
2 dozens of people where this same thing occurred.

3 For example, Waring --

4 THE COURT: Working for UGI when he was transferred?
5 You said he came from Milwaukee?

6 A. From Omaha.

7 THE COURT: Was he working for UGI there?

8 A. Yes.

9 THE COURT: Not with the subsidiary, but directly
10 working for them.

11 A. I believe so.

12 THE COURT: It's 1:00 o'clock, let's break for lunch,
13 and we'll start back at 2:00 o'clock.

14 (A recess was held at this time.)

15 THE COURT: All right, sir.

16 BY MR. FELMLY:

17 Q. Dr. Shrifrin, just before we broke for lunch we were
18 discussing the circumstances in 1910 when Mr. Waring came to
19 be the general manager of the gas plant in Charleston. And I
20 believe you had indicated that he had come from Omaha,
21 Nebraska, is that right?

22 A. Right.

23 Q. With regard to Mr. Waring --

24 MR. FELMLY: Your Honor, we have a composite exhibit
25 of personnel records that include a great deal of information

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1 on Mr. Waring and other people here. I have taken out of it
2 the portion that is the summary prepared by the counsel and
3 witness to which the stipulation related, and all of these
4 documents here have been part of the historic record and the
5 composite put together on personnel. And at this point there
6 were no objections to any of those underlying documents. I'd
7 move the admission of Exhibit 160.

8 MR. VARON: Let me just take a quick look. If you're
9 taking out the summary sheet and the underlying documents.

10 MR. FELMLY: All of the underlying documents, there
11 the only thing I took out was the abstract as to which the
12 stipulation related. So all of the underlying documents are
13 as you originally indicated you had no objection.

14 MR. VARON: That's fine, Your Honor, no objection.

15 THE COURT: All right.

16 (Plaintiff's Exhibit 160 received.)

17 MR. FELMLY: Now, as to Exhibit 160, Denise, are you
18 able to bring up Bates number 7107. And if you could
19 highlight the center paragraph, please. First of all, I guess
20 do the top of the page, please, first, Denise, so we can
21 orient the Court to what the document is. These are the
22 executive committee minutes of the United Gas Improvement
23 Company in July of 1910, which is a time proximate to the
24 coming of UGI to Charleston. Now if you'd go down to the
25 middle paragraph that you were discussing. That I was

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1 discussing.

2 Q. This references obviously Mr. Waring, G.H. Waring, being
3 transferred from Omaha effective July 1, and that's the word
4 they use, to Charleston.

5 And you were familiar with this, Dr. Shrifrin?

6 A. Right, yes.

7 Q. Was your understanding that Mr. Waring had previously been
8 at that UGI facility or company in Omaha?

9 A. Yes.

10 MR. FELMLY: If you could bring up now from this same
11 exhibit, Bates 7421. And at the bottom of the page please
12 highlight the section at the bottom. Again, let's do the
13 minutes at the top. I apologize for that, Your Honor.

14 BY MR. FELMLY:

15 Q. These are minutes of the United Gas Improvement Company
16 executive committee, these are November of 1910, several
17 months later. Now go to the bottom, please.

18 This relates to Mr. Waring's moving his family from Omaha,
19 does it, and the reimbursement of expenses?

20 A. Yes, the UGI committee is approving the moving expenses
21 for the transfer of Waring to Charleston.

22 Q. Let me ask you to -- as to Mr. Waring and the other
23 documents regarding him in this Exhibit 160.

24 MR. FELMLY: Denise, if you could bring up exhibit
25 Bates 0936. All right. And at the top of the page if we can

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1 identify what this is. This is an October 13th, 1917 article
2 in the American Gas Engineering Journal, and there's a segment
3 in there regarding personal notes on Mr. Waring that's in the
4 left column. If you could come down and highlight that, it's
5 in the center of the left column, if you remove the section at
6 the top and move down.

7 In this publication in the industry it describes that he
8 has been the past seven years general manager for Charleston.
9 It indicates Mr. Waring was sent to Charleston by the United
10 Gas Improvement Company from Omaha, where he was the head of a
11 large gas plant. It goes on to say he's been connected with
12 public service companies.

13 Q. Mr. Waring became the general manager in Charleston for
14 the subsidiary company, CCR&L?

15 A. Right.

16 Q. And in that year of 1910, was there discussion in the
17 community and in the public press related to the fact that the
18 gas plant was going to be built?

19 A. Yes, there were several newspaper articles in Charleston
20 at that time to that effect.

21 Q. And with regard to that, was Mr. Waring the spokesperson
22 that was discussing what was occurring in Charleston?

23 A. Several of the articles, if I recall, did quote Mr. Waring
24 about the construction of the new plant.

25 MR. FELMLY: Your Honor, similarly, Exhibit 157 is a

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1 composite exhibit of historic information related to
2 equipment, design, installation, minutes or historic records,
3 excerpts from newspaper articles and the like. I have removed
4 it from the summary sheet that was prepared, and as I
5 understood it previously, counsel had -- as we exchanged that,
6 had no objection to the underlying documents, as I understood
7 it.

8 I will offer this compilation of historic documents as a
9 full exhibit at this time, Exhibit 157.

10 MR. VARON: So this is just a collection of historic
11 documents.

12 MR. FELMLY: It's the same historic collection that
13 you exchanged and have seen, and except I've just taken out
14 the summary sheet or the abstract that we prepared to provide
15 an index.

16 MR. VARON: No objection.

17 THE COURT: Mr. Felmly, with the exhibit in that
18 condition, it's almost impossible for us to handle it. I mean
19 it's got to be stapled, if it's coming in as one exhibit it's
20 got to be hooked together. Otherwise the chance of losing a
21 page here or there is so great that we can't maintain the
22 integrity of the document.

23 MR. FELMLY: Okay.

24 THE COURT: So what I normally require when you have
25 a number of pages in a document is that they be stapled

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1 together.

2 MR. FELMLY: Would you prefer a loose-leaf notebook
3 as opposed to stapling them? There are different sizes and
4 shapes and some of them are small print. I'll do it any way
5 you like, Your Honor, we can easily accomplish it.

6 THE COURT: Well, obviously loose-leaf notebook is
7 easier for us to look at, but it takes up more room. But
8 either one, I don't want you to go to the expense of that, I
9 know there are different sizes, but that doesn't make any
10 difference, they've all got a top left-hand corner, and if we
11 can line those up and put a staple through it, I think it will
12 serve the purpose.

13 MR. FELMLY: I'm confident we can put it together so
14 they won't get lost.

15 THE COURT: Let's just do that. As I said, we're
16 going to break a little early today, and maybe y'all can look
17 at that and the clerk can assist you in assembling it and we
18 can determine first thing in the morning that there's no
19 objection to the exhibit in that form.

20 MR. FELMLY: My understanding, you have no objection
21 to the substance of the exhibit.

22 THE COURT: He said he has no objection.

23 MR. VARON: No objection to the substance.

24 MR. FELMLY: That's fine, Your Honor, I will do that.
25 Denise, you would bring up from Exhibit 157, Bates 1908.

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1 BY MR. FELMLY:

2 Q. Now, this is a newspaper article exhibit, it's hard to
3 read, the date looks like stamped August 8, 1910, that's the
4 date up in the top portion of the page. And the title of the
5 article is much better gas for Charleston, official statement
6 upon the building of the new plant here, Manager Waring
7 seeking the best.

8 MR. FELMLY: What I wanted to call attention to, and
9 in particular over in the right-hand column, Denise, and it
10 will be in that vicinity right over here, if you would, and
11 you're going to have to bring it up a little bit more. This
12 portion right in the center of that is what I'd like you to
13 bring up, is Waring makes the statement there that I want to
14 call to the attention of the witness.

15 Q. Starting at this point right here, and this is quoting Mr.
16 Waring, we are going to spend -- we are going to spend all the
17 money that is needed to build an up-to-date gas plant, and we
18 plan to put in gas mains, pipes, meters into the best
19 condition possible. Charleston should have more gas consumers
20 than are now on our books.

21 If you go down to the next paragraph just -- right below,
22 there will be no interruption of service.

23 MR. FELMLY: Denise, if you could bring that down
24 further, into approximately this area right here.

25 Q. Mr. Waring did not care to give the figure of the cost of

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1 building their new gas plant, and as a matter of fact, he
2 declared that he had yet as -- he had as yet attempted an --
3 no estimate, but he stated that the resources of the company
4 were practically unlimited, and that Charleston people might
5 be assured that they would get the finest gas plant in the
6 company of its size when this plan for water gas manufacture
7 had been completed and put into -- I'm not sure I can quite
8 see what that says -- current rate -- current -- into
9 construction.

10 Now, what I'd like to do at this point, Dr. Shrifrin, is
11 talk about what was built, what was the nature of the plant,
12 how it relates to UGI's involvement and operation of it.

13 First of all, the type of facility that was there prior to
14 1910 when UGI became involved was what type of a gas plant?

15 A. It was a coal gas plant.

16 Q. And what was built in 1910 in connection with the
17 description of the plant that Mr. Waring is talking about?

18 A. A carbureted water gas plant.

19 Q. Now, what I'd like to do is -- Let me go back one step.
20 What was UGI's relationship again to the technology or the
21 basis for building or going forward with a carbureted water
22 gas process?

23 A. UGI held the patent for the Lowe process, which was by
24 this point in time the standard carbureted water gas plant
25 design.

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1 MR. FELMLY: And if we can bring up Exhibit 75,
2 Denise.

3 Q. Have you, Dr. Shrifrin, taken and created a demonstrative
4 that shows the various differences of these types of plants
5 and how a manufactured gas plant operates, so that the Court
6 would have an understanding of what this does and how tar is
7 generated?

8 A. Yes.

9 Q. And with regard to that, if we can go to the first
10 substantive slide after the title here, this is Plaintiff's
11 Exhibit 75. What are we seeing in connection with this
12 depiction here, sir?

13 A. These are all the major steps in the manufacture of coal
14 gas. The shaded portion on the upper left is mainly the
15 difference between coal gas and carbureted water gas.
16 Everything outside of the shaded is almost identical between
17 the two. So let me just focus on the first shaded part. Coal
18 gas was made in what was called a retort, which was a
19 structure that had these long, usually ten- or 20-foot-long
20 tubes made out of either iron or clay brick, in which coal was
21 put.

22 These little doors that you see around here are the doors
23 that would open for the retorts. And the doors would be
24 closed and fire would be put under the retorts, and it would
25 burn for about 24 hours. And gas would rise up what was

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1 called the ascention tubes, those vertical tubes right here,
2 and go into the hydraulic main, which is this unit here which
3 was half filled with water and with tar. And that gas would
4 then move over to what's called the purification step, the
5 scrubber, the condenser, the tar extractor, the final
6 scrubber, the purifier, and then finally stored in the gas
7 holder, from which it -- from which it was distributed to the
8 city.

9 Q. Now, what are the principal by-products or contaminants or
10 impurities in this gas that have to be scrubbed out or dealt
11 with before it can get to the consumer and go into an
12 appliance?

13 A. Tar was the main by-product, although ammonia dissolved in
14 water was another by-product that was often recovered. But
15 tar was really the major by-product, mainly because it was so
16 valuable. And in this drawing, every place you see a little
17 bit of red, and I have a close-up of this later, is where tar
18 would accumulate in the system. But basically gas is made in
19 this part, and then in this part gas is purified, and then
20 here it's stored and distributed to the City.

21 Q. Now, why would there be red, or you say is tar down in the
22 bottom of that gas holder?

23 A. I have a close-up of that, but -- and you need to explain
24 the way a gas holder works. But basically the lower portion
25 of a gas holder was filled with water originally, because the

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1 steel part, which is this part here, called the bell, would
2 move up and down as gas filled the holder. And it needed a
3 seal at the bottom in order to prevent gas from escaping out
4 the bottom. So that bell would fall into a layer of water.

5 However, as the gas cooled inside the holder, tar would
6 condense out of it and fall into that -- into that bottom of
7 water. And that's the red accumulation at the bottom of the
8 water which is colored blue.

9 Q. Now, it may be an obvious point, but in terms of this
10 production process, what approximately was the end of the
11 manufactured gas period, of either carbureted water gas or
12 coal gas in this part of the United States?

13 A. More or less 1950. Natural gas started being distributed
14 nationwide around 1950, and that replaced manufactured gas.

15 Q. In terms of the production of tar, approximately what
16 amount of tar is produced in relation to volumes of gas? And
17 does it vary from the type of production at all?

18 A. It varies from production, and it varies from day to day
19 within production. But as a rule of thumb, from the technical
20 literature and also from plants that I've studied in terms of
21 real data, real gas production and real tar production, in
22 general, the rule of thumb is that every thousand cubic feet
23 of coal gas produces a gallon of tar. And every thousand
24 cubic feet of carbureted water gas produces about a half
25 gallon of tar.

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1 Q. Now, if we can move to the next slide, this is called
2 carbureted water gas production, the other production that
3 you've been discussing, and if you could explain for us, how
4 does this operate, and in particular, where does it differ
5 specifically from the earlier coal gas type of production?

6 A. The difference is in the shaded zone in the upper left,
7 again. This area is identical to the prior slide. The
8 purification step. What's different is the gas making step
9 which is right here. And then there's a temporary storage
10 step right here, which is called the relief holder. And the
11 reason that a relief holder is needed is because the gas
12 making step here is a cyclical process, runs about six or
13 eight minutes off and on. And the purifying step needs to be
14 a continuous process, so the relief holder serves as a damper
15 to take that cyclically produced gas and then feed it out into
16 the purifying step as a steady flow.

17 If you want to go to the next slide, I can show you a
18 close-up of the carbureted water gas plant.

19 This is what's called a water gas set. And it always
20 comes in these three units. And this is actually the Lowe
21 process. It has three basic unit operations. First is the
22 generator on the left, and in the middle is the carburator,
23 and at the right is the super heater.

24 In the generator, coke is loaded, typically coke, there
25 are some variations, coke is loaded into the generator, it's

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1 fired up, air is blown in, and it's burned so that it becomes
2 red hot. And that part of the cycle is called the blow. That
3 runs for approximately two to three minutes.

4 Once the coke is red hot, steam is injected in here to mix
5 into the coke. And carbon monoxide and hydrogen is formed as
6 a chemical reaction with the carbon from the coke. That's
7 called the run.

8 That material, that gas then runs into what's called the
9 carburetor. And during the blow cycle, the bricks, there are
10 bricks that are cross-sectioned all the way up these last two
11 units, they're heated up from the heat generated from the
12 burning of the coke. And that's called -- those are called
13 checker bricks. And those are heated up to a couple thousand
14 degrees typically, or 1000 to 2000 degrees. And as the gas
15 rises up into the carburetor, oil is sprayed down onto those
16 bricks.

17 The hot gas, the hot bricks with the oil spray causes the
18 oil to crack, break down from larger molecules to smaller
19 molecules, and then that mixture of gases, cracked petroleum
20 and hydrogen carbon monoxide, then move out this pipe into
21 what's called the super heater, which is nothing more than
22 more hot bricks that the gas passes up, and it's a process
23 which is called fixing the gas, where the molecules that have
24 been formed from the petroleum get fixed under -- under
25 prolonged heat so they don't revert back to larger molecules.

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1 At that point you have what's called manufactured gas
2 coming out here going into a series of steps that start
3 cooling the gas and storing the gas and purifying the gas.

4 Q. Let's go to the next slide. This is called tar collection
5 and separation. You've indicated the quantities of tar that
6 can be manufactured. What does this group of drawings tell us
7 in terms of the collection or separation of tar?

8 A. This -- first of all, this shows how intrinsic tar is to
9 the gas making process. In almost every step of gas making
10 and gas purifying, a little bit of tar is made. And all --
11 every place you see red is where tar starts accumulating. In
12 a carbureted water gas, the gas is first contacted by the wash
13 box, which is this unit here, which is simply a seal unit and
14 a cooling unit where gas bubbles through the wash box and
15 starts to cool from about 1500 degrees to about 200 degrees.
16 And that cooling process causes the tar to start condensing,
17 and it's accumulating a little bit right at the very bottom.
18 The equivalent of that in a coal gas process is the hydraulic
19 main. It's basically serving the same purpose to do the
20 initial cooling of the gas and the sealing of the escaping
21 gas. And in the hydraulic main and cross-section there you
22 can see the tar accumulating.

23 Gas then goes to a scrubber, which is more cooling and
24 also removal of ammonia. And all of these units collect a
25 little bit of tar, but that tar is mixed with water. All of

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1 those units, no matter what it is, what kind of plant, then
2 eventually goes into what's called a tar separator. The
3 function of the tar separator is to separate the tar from the
4 water. There's often also an oily phase which is a floating
5 phase which would collect on the very top of the -- the
6 separator. And that also is collected.

7 In addition to these unit operations that I would call
8 contact, meaning the gas has contact with water, there are
9 some noncontact steps in the gas making process which serve to
10 continue to cool the gas and to separate out the impurities
11 from the gas.

12 The first is a condenser, which is different from a
13 scrubber in that there's no contact. There's cold water that
14 runs through pipes and the gas runs up around the outside of
15 the pipes, all in a big can, and is collected while tar and
16 other impurities fall to the bottom. And that's the red that
17 you see.

18 There's the exhauster and then a tar extractor, which
19 again is the exhauster is nothing more than a pump to move the
20 gas. The tar extractor is aimed specifically to remove the --
21 hopefully the last drops of tar out of the gas before it goes
22 to the purifier steps.

23 It's a mechanical unit where gas is forced through small
24 holes, and blasts against an iron siding of the unit. And
25 that physical force or the friction causes the tar to fall out

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1 of the gas and fall to the bottom.

2 These items here, the tar from these items don't
3 necessarily have to go to the tar separator, because they
4 don't have water in them. But they may have a little bit of
5 water in them just because the gas itself has some water. So
6 often these streams also were sent to the tar separator.

7 And then at the end the tar separator cleans everything
8 and collects the tar basically from the bottom, where the tar
9 goes to storage, and the water either goes to a discharge like
10 a nearby lake or river, or in many plants was recycled back to
11 the gas making process.

12 Q. Let's go to the next slide. You were just on the subject
13 of this, obviously just a vignette, what was tar used for at
14 the plant in this historic era?

15 A. As I said earlier, tar was a very valuable commodity. In
16 the plant, tar was used in boilers, just as oil or coal would
17 be used to generate steam. So it was a fuel source.

18 In some plants they had even invented methods for putting
19 tar into the carburetor in a carbureted water gas plant to
20 actually make gas out of it. And there are some UGI operating
21 notes that show how they were working on that process, along
22 with others in the literature.

23 Q. Now, outside of the plant, if tar was accumulated, what
24 uses would tar commonly be put to in this historic period?

25 A. Tar had very many common uses. And one of the --

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1 something I'd like to emphasize with this drawing is that
2 today in 2009, we look at tar as a contaminant and it becomes
3 part of a superfund site. But even in the 1950s when I grew
4 up, tar was used every day to cover roads as a dust
5 suppressant, it was used -- and you see it here, it's
6 indicated here in this truck where the oil -- the tar is being
7 spread on the road, it was used as roofing material, and in
8 fact, it's still used as roofing material, and that's this
9 little gang of guys up there.

10 It was also used for paint or in paint formulations. It
11 was used to make creosote for wood preservatives. It had many
12 many different uses. And what I'm trying to depict here is
13 here we are in this illustration right next to a gas plant,
14 which is supposed to be indicated by the holders here, where
15 we're filling up tar and it's leaking on the ground here as we
16 fill it up, which is almost unavoidable. We're spraying it on
17 the ground. We're pouring it on top of the roof. And in
18 fact, in other places we made tar -- used tar paper to put it
19 on the sides of a building. And it was used every day and it
20 was a very common commodity. It's only recently that we
21 understand the chemistry of it and the risks of it that
22 we're -- regulatory agencies turn it into superfund sites.

23 Q. In connection with your study of many -- well over 100
24 manufactured gas plants, has much of the focus of that been on
25 situations involving the use or the leakage or issues with tar

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1 at plants?

2 A. Yes. There's a big focus on the historical leakage of
3 tar, because generally that's what has created the problems at
4 most MGPs, they're either state superfund sites or federal
5 superfund sites or just generally cleanup sites.

6 Q. So what I would like to ask you is based on your
7 experience and your knowledge and working in all these sites,
8 can you tell the Court -- and we can go forward in these
9 slides -- what are the common ways in which we can go -- we
10 can go past the tar products -- He just talked about this.
11 What are the common ways in which tar finds itself into the
12 environment or gets into the environment from a manufactured
13 gas plant, what are the common media that are involved? And
14 we'll relate them specifically to Charleston.

15 A. Tar enters the environment at a manufactured gas plant
16 from leaks -- and I'll define what that means -- from spills,
17 and in some cases from direct discharges. But most of the tar
18 at most of the plants that I've worked on are really from
19 leaks and/or spills, not from direct discharges or dumping.

20 Q. And let me just ask you with respect to the Charleston
21 plant, and I'm talking about the history of the plant, to what
22 extent is there evidence that you've seen of intentional
23 discharge? In other words, actual dumping, as opposed to a
24 source that is leakage or not intentional?

25 A. There's very little evidence for direct discharge. The

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1 only evidence that I'm aware of, I wouldn't -- I don't know if
2 it's evidence -- there's one of the environmental reports
3 describes the tar that it observed in the Imax area as being
4 more likely from deposition, meaning dumping, than from
5 migration. And EPA recounted that also, I believe in its
6 first ROD. And the reason that they described at this way was
7 because they described it as being patchy, as opposed to
8 continuous, and that indicated to them, the observers in the
9 field, that it was possible that it was dumped there as
10 opposed to migrated there.

11 MR. FELMLY: Your Honor, before I move to the next
12 set of slides, although it is a demonstrative, I'd ask that
13 the exhibit that we just went through with Dr. Shrifrin,
14 Exhibit 75, be marked as a full exhibit.

15 MR. VARON: That's fine, Your Honor.

16 THE COURT: Okay, without objection.

17 (Plaintiff's Exhibit 75 received.)

18 BY MR. FELMLY:

19 Q. What I'd like to do now is to talk about the way -- the
20 manner in which tar can get into the environment at a
21 manufactured gas plant.

22 MR. FELMLY: And ask Denise to bring up Exhibit 76,
23 please. And if you'd go to the first slide, please, Denise.

24 Q. This obviously discusses groundwater, and we had a little
25 discussion of that yesterday, but why is that important in

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1 terms of analyzing or considering the way in which tar impacts
2 the environment?

3 A. It's useful to understand what groundwater is. I think
4 sometimes there are misconceptions, because some people think
5 that groundwater are rivers under the ground. And although
6 they do exist that way sometimes, most often they do not, and
7 they don't in Charleston. In Charleston, as in many areas,
8 the subsurface is a layer cake of sand and clay and silt, and
9 eventually you get deep enough, bedrock. That would be this
10 layer here.

11 Within that, the upper portion above the bedrock up here
12 is what we call the overburden. And the overburden is what --
13 we also call that porous media. There are grains of sand or
14 clay or humus or whatever. And in between those grains there
15 are voids. And beneath the water table, which is this area
16 here, all of the intercedes, all of the pores between the
17 grains are filled with water. And that's called groundwater.
18 That's called the water table -- the -- below the water table.

19 Above the water table, which is up here, we call the
20 vadose zone, which is an area where the pores are filled with
21 air as opposed to water. And right at the interface here
22 there is an area here where some of the grains are filled with
23 water and some of the grains are not. It's actually a very
24 complex area at the water table, because there's a gradation
25 of moisture, and it's not as clean cut as containing water or

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1 not. But basically there is that interface area.

2 So when we talk about groundwater, we're talking about all
3 of this material that is below the water table where the pores
4 are filled with water. And there's also a hydraulic, what we
5 call a hydraulic gradient, you can see that the level here is
6 higher than the level here, and that creates a pressure, that
7 creates a driving force, so that in this case the groundwater
8 would be flowing in this direction from high water to low
9 water.

10 And we see that in Charleston where we have water
11 elevations and they flow towards the river and it flows
12 towards the drain.

13 Q. Let's go to the next slide. Now, this is entitled NAPL at
14 former MGPs. In the context of what various features or
15 mechanisms that relate to contamination here, what is this
16 depicting and how does it relate to the understanding of the
17 environmental situation at Charleston?

18 A. Okay. Just as a reminder, the acronym NAPL stands for
19 nonaqueous phase liquids, and in this case, an MGP case, such
20 liquids essentially are tar, sometimes they're oil, and -- but
21 in this case it's tar. And the brown is meant to depict NAPL
22 at an MGP. And what we distinguish further is a DNAPL, a
23 dense NAPL, meaning it sinks through water, doesn't float on
24 water.

25 And what this picture is meant to portray is the various

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1 sources and the type of fate of NAPL at an MGP.

2 Here on the left is my depiction of a former gas holder
3 bottom that was buried under the ground years ago, and you may
4 have a little bit of tar left in that, which is exactly the
5 case at Charleston. There may be cracks, small cracks, there
6 may be large openings. In any case, the general tendency of
7 NAPL, DNAPL, tar, at an MGP, is to move outward and downward.

8 Basically downward, because it's denser than water, so it
9 wants to sink straight down. Sometimes outward, because the
10 subsurface is never one medium, sometimes there's little clay
11 lenses, little silt lenses, little impurities in the sand
12 grains. And so in general, what happens is that you get
13 what's called fingering, these kinds of things here, as the
14 NAPL wants to move downward, it hits different kinds of pore
15 sizes and moves out and down some more and out.

16 The other important feature here, the clay tends to be
17 what we call a confining layer. A confining layer is a
18 material in the subsurface that has pores so small that NAPL
19 can never penetrate. And the reason it can't penetrate is
20 that it cannot displace the water that's already in the pores.
21 There's a competition for fluids in a pore. And if tar is
22 competing with water, whether or not it succeeds in moving
23 into that pore depends on the pore size, the aperture of the
24 grain size.

25 Generally at MGPs, and for most NAPLs, clays are viewed as

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1 confining layers, which is depicted here, here and here. When
2 a NAPL hits a clay layer, it won't move downward any further.
3 So it will move along the slope, or it might get trapped in a
4 bowl shape of the clay, and that's what happens out in the
5 field. You see -- sometimes you see NAPL very far away,
6 because it's hit these lenses and keeps moving and migrating
7 downhill. Sometimes you see it stuck right underneath a
8 source, because it's trapped in what we call a stratigraphic
9 trap, a bowl-shaped element of the natural layer. And
10 sometimes you see it just in the material in the subsurface
11 stratigraphy itself, because it's leaving a trail behind
12 itself. It's sticking to the pores of the grains. And
13 sometimes that material is petered out, meaning we call that
14 residual NAPL that's stuck to the grains and there's no more
15 that can migrate. Sometimes enough of it has been spilled or
16 filled so that it continues to migrate, continues to be a
17 source.

18 Q. Now, to what extent, based on your experience in examining
19 many many many of these sites, and mindful of these
20 mechanisms, to what extent can you examine it with your
21 scientific and engineering background and draw conclusions as
22 to what may well have been the source, or what probably was
23 the source of the NAPL that is now seen in the subsurface near
24 or beneath the MGP?

25 A. There's two things that we try to do. The first is we try

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1 to understand the sources. At an MGP, a typical source would
2 be a gas holder bottom. So is there a source of NAPL, where
3 was the gas holder, where was the tar tank, where was the
4 condenser. Those are the primary sources.

5 We might expect to see tar right within those areas or
6 right below those areas, because those were primary sources.
7 However, sometimes tar can migrate. So we also look at the
8 stratigraphy in the subsurface and ask the question, are there
9 any elements of the subsurface that would enhance or allow for
10 the migration of the tar.

11 So in this case there are clay layers, so we look at
12 what's called soil borings that are recordings of the field
13 personnel who observe, write down what they observe in the
14 field. And we look to see what kind of stratigraphic layers
15 there are in the soil, just in case when we're looking at tar
16 here, if we understand this clay layer and this lens and this
17 lens, we can deduce that this was the source, not this, for
18 example, or might be both, but putting the whole picture
19 together, understanding both the primary sources and the
20 stratigraphy of the subsurface, allows us to look at the
21 spacial relationships of both the primary sources and the
22 secondary migration patterns.

23 Q. What is the -- if we're talking about tar, this dense
24 nonaqueous phase liquid, what is the area of life expectancy
25 or the period of time within which this product, if it is

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1 leaked down into the ground, will stay in the ground, or
2 what's the range of times that scientists like you understand
3 would commonly be involved?

4 A. Thousands of years. And let me elaborate on that answer a
5 little bit. If it's just pure tar, the liquid tar in the
6 ground, that liquid tar will create groundwater contamination
7 for thousands of years. Because it will take that long for
8 the fresh groundwater to flow through it and dissolve all the
9 constituents in it.

10 If you remove the liquid tar, and you're left with what we
11 call residual tar, which is tar stuck to soil but not enough
12 to migrate, it is likely still to be hundreds and thousands of
13 years to clean up the groundwater. And that's why
14 Mr. Effinger earlier today said you're much better off
15 excavating and getting all the soil out, than you are to just
16 pump the DNAPL out of the ground. Because if you pump the
17 DNAPL out of the ground, you're still left with soils with
18 residual NAPL. And those soils with the residual NAPL will
19 still serve as a source of groundwater contamination for
20 likely thousands of years.

21 MR. FELMLY: Let's go to the next slide, if you
22 would, Denise.

23 THE COURT: Now, does the condition of the soil make
24 any difference? If it's sandy soil as opposed to clay?

25 A. A little bit of difference, but not a real lot. If it's

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1 clay, it won't penetrate, so it will stay on the surface. If
2 it's sandy soil it will release the contaminants a little
3 faster than if it was, say, humic soil.

4 THE COURT: Because I live not too far from this
5 site, I live downtown Charleston, and I do a lot of gardening.
6 And I notice in Charleston, that the soil doesn't seem to hold
7 water. I've always suspected it's sandy below the surface,
8 and the water just seems to run right through it.

9 A. That's right.

10 THE COURT: Which would make it conducive to cleaning
11 something like this up.

12 A. That's right.

13 THE COURT: More than if it were clay.

14 A. And there's two mechanisms for that. One would be it
15 allows more water to come through, so it flushes faster, but
16 the other, there's a process called adsorption, where the
17 molecules, through molecular forces, actually stick to the
18 soil. And if you have humic soils that don't drain very well,
19 they bind the contaminants much better. So it takes more
20 water to flush them out. So if you have sandy soil, it will
21 flush a little bit faster, but it's still hundreds of years
22 and possibly thousands.

23 BY MR. FELMLY:

24 Q. Looking at this slide that we're depicting now that you've
25 presented in this exhibit, what, in terms of the mechanisms by

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1 which tar at a manufactured gas plant can leak or find its way
2 into the environment, what does this show us or how does this
3 help that understanding?

4 A. Well, first let me explain how a gas holder works. A gas
5 holder, as I mentioned earlier, consists of two parts, the
6 bell and the bottom. The bottom is actually a term of art,
7 and it really means the tank. It's designed to be a tank that
8 holds water. The bell often is telescoping. It may have one,
9 two or three, sometimes even four telescoping parts. For
10 simplicity here I just show one. But at any rate, the bell
11 moves up and down. As gas fills it up, it moves up, and as
12 the gas is depleted, it moves down. But always with a little
13 layer of it sunk into the bottom, because the bottom is filled
14 with water, and that's how the gas is sealed from leaking out.

15 In the right-hand side is a cut-away view. And it shows
16 that in the bottom, initially the bottom is filled with water.
17 But over time as the gas condenses and gas comes in from the
18 manufacturing in one pipe and then goes out in the other pipe
19 to either the rest of the processes or the City, the bottom
20 area is filled with fluid. And the fluid starts as being
21 water, but over the years or months, weeks even, as the gas
22 cools and condenses, the tars fall out and the oils fall out
23 and the tars sink to the bottom and the oil floats on the top.

24 Periodically these tars and oils were emptied out and then
25 sent to the separator and reclaimed for sale.

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1 Q. In terms of those tars that accumulate in the bottom, as
2 you call it, of the gas holder, and having in mind we're not
3 familiar with the exact dimensions of these structures, what
4 types of volumes can be stored or accumulate in the bottom of
5 a gas holder, comparable to the kind you've shown here?

6 A. This volume here of fluid could be anywhere from a couple
7 hundred thousand gallons to over one million gallons.

8 Q. And you indicated that there were methods to remove the
9 tar from the bottom of these holders?

10 A. Yeah, sometimes the system was piped to be able to remove
11 it routinely. Sometimes it was an opening where they would
12 drop in a line and pump it out.

13 Q. And in the time period that we're talking about in the
14 historic period here in Charleston with the site here, what
15 type of construction or materials formulate the bottom of the
16 gas holder, this portion that is going below grade and is
17 going to be storing these liquids and possibly tar?

18 A. From the early 1800s to the early 1900s, this material was
19 made of masonry, typically bricks, bordered bricks. And it
20 was an important design element actually to design it so that
21 all of this soil around it was structurally sound so it would
22 tend to be part of the structure of the holder. That was
23 called mudding.

24 Later on, the bottom material was made of concrete. And
25 as reinforced concrete started being used in like maybe 1910

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1 or so, it -- they were able to design holders above the ground
2 with the bottom really up in this area, because you didn't
3 need the structural support of the soil any longer.

4 Q. Now, how about the holder that is at the site? And
5 indeed, I guess the bottom is still at the site, is that
6 right?

7 A. Right. There are two holders at the site. There's a City
8 holder and the relief holder. And the City holder has a
9 wooden bottom. The actual bottom part of the holder is wood,
10 and the sides are masonry.

11 The relief holder, I believe, is concrete, I'm not sure,
12 might be brick, but the distinguishing feature of the relief
13 holder is it's built on pilings. Perhaps hundreds of pilings.
14 In order to give structural support that go down through the
15 confining clay layer into the lower layers, through the
16 intermediate layer. The intermediate aquifer.

17 Q. When you say pilings, what would be the material that was
18 originally installed there to provide support?

19 A. Like telephone poles. The equivalent of telephone poles.
20 Not really telephone poles, but I believe the pilings are
21 wood.

22 Q. And that structure was built when?

23 A. In 1910.

24 Q. When the plant was rebuilt?

25 A. When the plant was rebuilt.

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1 Q. And we had some discussion earlier today with Mr. Effinger
2 over whether the substation had some pilings, the electronic
3 or electrical substation had some pilings that went through
4 clay layer. Have you determined whether or not these pilings
5 go through the clay layer?

6 A. My understanding is that there are no pilings that went
7 through the clay layer in the substation, but there were
8 grounding rods that may have gone through the clay layer.

9 Q. What about the relief holder that was built in 1910, are
10 there pilings that go through the clay layer there?

11 A. Yeah, those pilings went through clay layer.

12 Q. And I think I heard you say there were hundreds of them in
13 connection with this structure?

14 A. I recall reading that they were spaced one foot apart.

15 Q. So in terms of that process as they built that holder,
16 what's the significance in terms of the potential for
17 migration of contaminants with those many, if not hundreds of
18 pilings that go down deep and through the clay layer?

19 A. Those pilings would have introduced migration pathways for
20 the tar to go into the intermediate aquifer.

21 Q. Let's go to the next slide. In terms of the structures at
22 a manufactured gas plant, based on your experience and your
23 work in reviewing many of these, we've been talking about the
24 gas holder. How important are gas holders in your experience
25 and knowledge as significant sources for tar, DNAPL type

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1 pollution?

2 A. Gas holders at MGPs are almost always a source of tar
3 contamination in the subsurface. Of the 130 some odd sites
4 I've worked on, maybe averaging two gas holders per site, some
5 had three or four or five, so let's say I've looked at 250 gas
6 holders; maybe I've seen ten that don't have tar under them.

7 Q. And you mentioned that the bottom of the -- was it the
8 relief holder or the City holder that had the wood bottom at
9 Charleston?

10 A. The City holder.

11 Q. I'm trying to frame the question in terms of a structure
12 that has got to be watertight and is going to not leak. How
13 would wood or what issues would arise in using wood in
14 connection with that in terms of the potential for leakage?

15 A. Wood, the wood bottom most likely leaked. I mean, I would
16 be extremely surprised if it didn't leak. They still make
17 wood tanks, water tanks. In New York City on top of every
18 tall building is a wooden tank. So they can be made not to
19 leak, but over a short period of time they will degrade and
20 leak at the seams. So the fact that the City holder had a
21 wooden bottom gives it a higher likelihood that it leaked very
22 early and leaked fairly constantly.

23 I have 50 years on this drawing here as sort of the
24 outside time frame of the full effect of leakage. But my
25 sense is that gas holders started leaking perhaps within the

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1 first decade that they were installed, particularly a gas
2 holder with a wooden floor would start leaking almost
3 immediately.

4 Q. And in terms of the drawing you have here, what is the
5 mechanism or the ways in which you're depicting here that
6 commonly occurs?

7 A. As you can see, the tar accumulates in the bottom of the
8 holder. Masonry holders almost inevitably have cracks in
9 them. They're not designed to have cracks in them. Every gas
10 manufacturer hopes that they can install one that doesn't have
11 cracks in them. But eventually they all spring cracks. And
12 for a couple of reasons. One is just the nature of brick
13 masonry, it's going to have cracks. I don't think you can see
14 anything out in the street here that won't have cracks in the
15 masonry. But there are natural forces that cause it to have
16 cracks, such as subsidence, vibrations, just mechanical wear
17 and tear and age. Age of the mortar, for example.

18 So what I've depicted here are a few cracks that have
19 formed in the bottom of a holder. They might also form in the
20 side of a holder. And often we say that the bottom leaked,
21 but it's not the bottom of the bottom, it's the side of the
22 bottom. But regardless, here just for simplicity I'm showing
23 leak cracks in the bottom of the bottom of the holder. The
24 tar has leaked out, hit a clay layer, so that it takes a
25 little right turn here, and eventually cascades into the --

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1 into the water table, which is depicted by this dash line,
2 falls again onto another clay layer where it travels downhill
3 slightly as tar, while the pink is denoting the constituents
4 in the tar dissolving in the groundwater so it's forming a
5 groundwater contaminant plume.

6 But at the same time, the tar itself, the primary source,
7 is migrating down the clay layer, eventually into the bedrock,
8 pooling in the bedrock, where we now have from this source
9 here, a fairly wide, long and wide area of primary source
10 createing a groundwater plume.

11 Q. Now, when we were looking at the aerial photo earlier in
12 your testimony and we had the various dimensions of the
13 superfund site in relation to where the historic gas plant
14 footprint was, to what extent does the process you're
15 describing here, this movement, in your opinion, relate to the
16 fact that there is contaminant outside the exact footprint of
17 where these structures were historically?

18 A. My sense is that at the Charleston site you have some of
19 these lenses, like this here which is causing this downward
20 and outward migration.

21 Q. And in terms of the area or direction of flow,
22 particularly of groundwater at the site, which direction does
23 it flow at the site?

24 A. It flows in two directions. It flows -- part of the
25 groundwater flows to the river, which is east. And part of

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1 the groundwater flows south to the Calhoun Street sewer. The
2 sewer serves as a sink to attract that groundwater. So at
3 this site groundwater flows in two directions.

4 Q. What is the significance, if any, of structures like
5 sewers or passageways or pipes, in terms of being conduits or
6 a means of conveyance for pollution? How common is that?

7 A. It's very common. And, in fact, you always look for that.
8 We have a term for it, we call it preferential pathways. And
9 there's really two types of preferential pathway that a sewer
10 can present. One is the pipe itself that is almost always
11 cracked, and has an infiltration problem. But the second is
12 the porous medium that typically the pipe is built in.
13 Usually pipes are put on a bed of gravel, and that gravel
14 outside of the pipe serves as a preferential pathway for
15 migration.

16 Q. And is that an issue here at Charleston?

17 A. This was an issue in Charleston, and that's why the City
18 put a barrier wall up along the new bedding as it replaced the
19 leaky pipe.

20 Q. Let's go to the next slide. Before I ask you about the
21 picture here, can you just describe to the Court the nature or
22 quantity of the piping that a manufactured gas plant would
23 have as these various structures you've described are
24 conveying these fluids and these gases across the span of the
25 site?

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1 A. It, of course, varies tremendously by the plant, but if a
2 plant is typically five acres and has 30 pieces of equipment,
3 connecting gate, water, sewer and tar, it could have a mile of
4 pipe.

5 Q. A mile of pipes?

6 A. Most of them being buried in the ground, although that
7 varies, too.

8 Q. And to what extent are the potential contaminants,
9 particularly tar, conveyed by these pipes or moved from one
10 location to another by these pipes?

11 A. All plants had tar transfer piping to go from the holder
12 to the separator, from the separator to the storage tanks,
13 from the condensers to the separator, so there was tar
14 transfer piping all around these plants.

15 Q. And based on your experience and your examination of these
16 many sites, to what extent have you found and experienced
17 situations where these pipes that were conveying tar in this
18 historic period, either leaked or had the ability to have the
19 tar come out of them?

20 A. Well, we have seen, I've seen pipes uncovered in today's
21 time frame, that still have tar remaining in them, and when
22 the backhoe hit them, they started releasing their tar.

23 We also see, when we evaluate/interpret the environmental
24 data, most often we see the tar accumulated under the holders
25 and the tar tanks. But every now and then we see tar that is

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1 in the -- sort of in the middle of no place, or in between two
2 tanks or the holder or tanks. And from the boring data, it's
3 difficult to conclude that it was dumped there, because there
4 isn't a trail of tar all the way to the surface or the pattern
5 of tar is not for dumping. And most often that will be from
6 tar transfer piping. From a leak like this.

7 Q. And is this drawing here demonstrative of the kind of
8 mechanism that may be involved when you have some break or
9 corrosion in the pipe that's carrying the tar?

10 A. Yeah, what I've tried to do here is show two main
11 mechanisms. One would be from a joint, which this is supposed
12 to depict, which is a flange, flanges have gaskets, the
13 gaskets over time wear out, or flanges are really pressure
14 points that are subject to a little wiggling or whatever. So
15 flanges often leak. That's one area.

16 And then this second area here is meant to denote a
17 corrosion break or a mechanical failure of the pipe.

18 In 1986 EPA did a study of underground pipes and tanking
19 and found that within 11 years steel piping corrodes enough to
20 spring a leak. There are some contemporaneous MGP literature
21 that I have that indicate that almost instantly from
22 installation, various -- for various reasons, corrosion,
23 whatever, could occur within six months.

24 MR. FELMLY: Let's take a look at the next slide,
25 please.

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1 Q. This is reference spills. Having in mind your knowledge
2 and experience as to how these plants were operated and the
3 various tasks that the people operating and managing the plant
4 on a day-to-day basis did and the things they did, how big an
5 issue were spills during this historic period as far as
6 targeting into the ground?

7 A. Spills always occurred. Nobody ever wanted them to occur.
8 They were -- I doubt that they were ever intentional. I mean
9 there are -- I have seen some cases where dumping was
10 intentional, but spills are -- might be equivalent to when we
11 fill up our gas tank at the gas station, I would defy any of
12 us, I've been trying for years to not spill that last drop as
13 you pull the nozzle out of the filler cap. Well, multiply
14 that times some multiple where you're filling up a 5000-gallon
15 tanker truck or railroad car or something like that, and
16 you're bound to spill some during the filling process. You're
17 always bound to create some spills by knocking over barrels or
18 something like that. All of these things are accidents, but
19 they occur in chemical factories where fluids are handled.

20 And this picture is -- I tried to denote what would happen
21 to a spill. A spill would typically be near the surface of
22 the ground, the top of the ground. This area here. And if
23 enough material was spilled, it would actually migrate
24 downward as NAPL, while creating sort of a cloud of
25 contaminated percolation, as rain water percolates around it.

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1 But once it hit the water table it may hit clay, it may
2 continue to migrate downward, but that's where its
3 constituents would start dissolving and create a real
4 groundwater contaminant plume.

5 Q. Now, in terms of what we've been seeing here, sort of in
6 the environmental slides and the spills and the leaks that
7 you've been showing, do you believe that the mechanisms that
8 the tank leak and the pipe lining leak and the spills in all
9 probability were involved in terms of the circumstances under
10 which the tar at the Charleston plant most likely than not was
11 deposited?

12 A. I believe that the sources of tar at Charleston were the
13 major pieces of equipment that handled tar, the holders and
14 the tar tanks and the separators.

15 MR. FELMLY: Your Honor, I would ask that the slides
16 that we've shown here, which is Plaintiff's Exhibit 76, the
17 environmental demonstratives, be marked. I will say that
18 there's one additional slide that I didn't ask Dr. Shrifrin
19 about, I've taken out, which was oil leaks, because I don't
20 think we have an issue with oil leaks here. But we're moving
21 that particular slide. I'd ask that this demonstrative be
22 marked as a full exhibit.

23 MR. VARON: One second. Your Honor, I guess the only
24 thing we'd say is it should be clear that these are
25 illustrative and not necessarily representative of Charleston,

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1 and as illustrative ways that Dr. Shrifrin described targeting
2 into the ground and groundwater, we have no objection.

3 THE COURT: Okay. Well, if it doesn't have anything
4 to do with Charleston, how is it relevant?

5 MR. VARON: Well, I think that's for them to
6 establish.

7 MR. FELMLY: I just asked the foundation of whether
8 or not -- the last question before I moved it was, did these
9 three things that I've discussed in his opinion relate to what
10 happened in Charleston, and he indicated he believed they did.

11 THE COURT: And he's shown the direction of the
12 contaminant. He's directed it towards the river, towards
13 Calhoun Street, I mean he's talking about Charleston. He's
14 not talking in the abstract.

15 MR. VARON: I understand, but these pictures, Your
16 Honor, these pictures hypothesize that a flange broke, there's
17 no --

18 THE COURT: I don't think the pictures are
19 necessarily drawn to scale, I don't think they necessarily
20 depict exactly what happened here. He hasn't said that he dug
21 any holes in the ground. I'm assuming that he's relying on
22 his general knowledge as to the composition of the soil.

23 A. Right.

24 MR. VARON: We have no objection to the exhibit
25 coming in.

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1 THE COURT: Without objection.

2 (Plaintiff's Exhibit 76 received.)

3 BY MR. FELMLY:

4 Q. In connection with the Charleston plant that was built in
5 1910 and I think into '11, the carbureted water gas process,
6 what is the relative level of complexity of operating a plant
7 like that from the point of view of a manufacturing process?

8 A. These were chemical manufacturing plants, and they were
9 very complex. They might seem simple because they might have
10 five or ten unit operations. But I have seen operating
11 instructions, even UGI's operating and engineering notes, and
12 textbooks, many textbooks, several textbooks of several
13 volumes in terms of how to build and operate manufactured gas
14 plants. These on the surface may seem like simple things to
15 operate, but they were as complex as any chemical plant to
16 operate.

17 Q. And what would be, with respect to the making of the gas
18 and this -- these processes of either combustion or
19 pyrolization, what would be the reasons or the ways in which
20 the complexity of those would confront the operators?

21 A. The operator would be confronted with two things, really.
22 One is the quality of the gas and the by-products. For
23 example, if you heated the coal or coke poorly or didn't run
24 the carbureted water gas system poorly, you'd get a poor
25 quality gas. If you got a poor quality gas, it might have

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1 poor candlepower. And in the early days, if people were using
2 it for lighting, the customers would complain, you're selling
3 me poor quality gas.

4 It might have poor heating value, if you're using it for
5 heat.

6 If you're not operating all of your unit processes
7 properly, you might be creating too much tar and you might be
8 creating emulsions in your tar.

9 Q. Let's stop there and find out what some of those words
10 mean. First of all, what is an emulsion?

11 A. An emulsion is a mixture of two liquids that will never
12 separate. Or will never separate on their own. Mayonnaise is
13 an emulsion, for example.

14 Q. And how are emulsions, you mentioned you might create an
15 emulsion if you don't run it properly. What, in the context
16 of a manufactured gas plant, creates an emulsion? Because I'm
17 guessing it's not mayonnaise, so what happens?

18 A. Carbureted water gas plants were very tricky things to
19 operate, because they tended to make emulsions. And the
20 prevailing theory of emulsion formation in carbureted water
21 gas production was carbon black would be produced. Usually
22 because the heat in the generator was too hot. But sometimes
23 because the blow was too fast, or there could be other
24 factors, bitumen instead of coke being used could be a factor,
25 in other words, the generator fuel. There were a number of

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1 factors that could generate excess carbon black, which is just
2 soot.

3 And the theory was that that soot, the carbon black,
4 served as a nucleus for attracting some of the tar into a
5 micelle, which means different charges, that would stabilize
6 within water.

7 And this is an example of both the art and the engineering
8 of gas production, that if you did it wrong, even slightly
9 wrong, you could start forming an emulsion. And emulsions
10 were terrible problems at carbureted water gas plants. If you
11 didn't deal with them, you created a tar that nobody wanted to
12 buy.

13 Q. Why is that?

14 A. Because typically contracts from tar distillers with gas
15 manufacturers required that the tar have no more than
16 three percent water in it, or they wouldn't buy it. Or if
17 they did buy it, they would buy it for a cheaper price because
18 it would cost them more money to distill it. And transport
19 it. Because you're transporting a lot of water instead of
20 tar.

21 Typically what carbureted water gas plants did was they
22 would distill it themselves, or they would demulsify it. And
23 typically -- and this plant had one, the Charleston plant had
24 one -- you would see a unit operation called a demulsifier.
25 And often what that was, was just a heating unit, sort of a

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1 condenser in reverse, where you were able to heat the tar and
2 the heat would break the emulsion, and then you would collect
3 the demulsified tar and you could sell it to a distiller.

4 But as you can imagine, that's more trouble, it's more
5 money, and if at all costs you could avoid creating the
6 emulsion at the generating step, you would try to do that.
7 And this was a constant struggle in these gas plants. And
8 this is just another example of why these were not simple
9 things to operate.

10 Q. Well, in terms of the individuals that were actually on
11 the ground working the dials and determining whether the blow
12 should go a particular distance or not, how did they obtain
13 the information as to how to operate them?

14 A. Like I said, there were textbooks. There were operating
15 manuals. And there were policies and procedures that a
16 company would develop, you know, through its own development
17 of its own art.

18 Q. And in terms of the issue of whether a particular plant
19 was going to have a higher potential of discharge of tar, to
20 what extent was the issue of formation of emulsions, I'm
21 really asking based on your experience, if you're talking
22 about what's the risk of a particular plant having tar
23 discharged, how do the formation of emulsions, in your
24 experience, factor into that?

25 A. If you had a plant that was forming emulsions, you would

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1 be more likely to discharge that as waste water. Or, you
2 would have to spend the money to buy new unit operations,
3 demulsifiers, centrifuges and things like that to manage your
4 emulsion so you didn't discharge the emulsions.

5 Q. So in the big picture, if you're talking about the role of
6 the operator of the manufactured gas plant and its
7 relationship to tar, what is your opinion with respect to the
8 relative importance of the handling, storage and management of
9 this by-product as part of the gas manufacturing process?

10 A. It goes hand in hand. I doubt that there was ever a gas
11 plant operator that didn't have both gas and tar on his or her
12 mind. When you make gas, you make tar. When you make tar,
13 you have to manage that tar. If you don't manage that tar,
14 first of all you're wasting money, and second of all, you're
15 forced to discharge it to the environment.

16 Q. So as you looked at the history of the manufactured gas
17 plant in Charleston, and in particular during the era 1910 to
18 1926, have you looked to examine the extent to which the
19 operator of the plant was dealing with tar-handling structures
20 and tar-handling equipment?

21 A. Within that time period there's clearly tar-handling
22 equipment present.

23 Q. And are there also the tanks that you were describing, the
24 relief holder and the gas holder which you've indicated are
25 probable sources of leakage?

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1 A. Absolutely. I mean, those two structures are unavoidable
2 in a carbureted water gas plant.

3 Q. And have you made an assessment of the equipment that was
4 available at various times, in order to better understand what
5 was there at various years and what was there during a
6 particular period of time when UGI was involved in the plant?

7 A. I have, and I wrote a report where we chronicled
8 everything that we knew about the tar-handling equipment.
9 There are two ways that we know historically tar-handling
10 equipment. One is static from inventories and/or maps,
11 engineering drawings. That gives us the existence of
12 equipment at a certain point in time.

13 The other way we know and we reconstruct, is from
14 accounting information. When there's an authorization to
15 purchase a new tar still, for example, we know the date of
16 that from the accounting record and assume that it happens,
17 you know, within that time frame. So we might be off by six
18 months or something like that.

19 But so that's more of a dynamic piece of information where
20 we see that somebody is actively authorizing the installation
21 of something, and then we have the static information, which
22 is inventory information and/or engineering drawings.

23 Q. In connection with this case, have you gone through the
24 historic information and the various indicators as to when
25 equipment was purchased, and other data that would identify

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1 what would have been on the scene at various points during the
2 plant's history, in order to formulate an inventory or an
3 assessment at various times that would identify where that
4 equipment was and when it was provided on the site?

5 A. Yes, we've done that, and we've drawn that all on a map of
6 the site.

7 Q. And have you -- and to what extent have you endeavored to
8 determine that in relation to UGI's period of ownership or
9 operation, as is claimed by us in this case? In other words,
10 the period 1910 to 1926?

11 A. We have chronicled all of the equipment at the site, and
12 then we have culled out the equipment that was installed
13 during that period 1910 to 1926. And have noted that on a
14 map.

15 Let me just add onto that, we've also noted equipment that
16 was in existence and operated during that period.
17 Distinguished from being built during that period.

18 Q. And in connection with that analysis, to what extent do
19 you believe you have a good historical understanding and
20 ability to determine or set forth what was UGI's equipment
21 that was connected with UGI operations, either by way of
22 building or purchase or there in the period of time when it
23 was being operated.

24 MR. VARON: Objection to UGI operations. There's no
25 evidence that UGI operated any of this equipment. If you want

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1 to show it was in this time period, that's one thing.

2 THE COURT: Let's see what his answer is.

3 A. I have a high confidence that we've identified all of the
4 equipment that existed and/or was installed during that time
5 period.

6 MR. FELMLY: What I would like to bring up now from
7 Exhibit 78, Denise, is the historical composite. Now, the --
8 I'm going to get to that one in a moment, but the one before
9 that. I don't have a Bates on this. If it's a problem for
10 you, I can do it on the ELMO. Yes, that's it.

11 BY MR. FELMLY:

12 Q. First of all, Dr. Shrifrin, the diagram that is on the
13 monitor here is entitled UGI in Charleston. Is this a
14 depiction or a demonstrative diagram that you've prepared
15 based on that process that you just described to the Court of
16 acquiring information about the various pieces of equipment
17 that were related to UGI, either in terms of the period of its
18 operation or identified in records by either purchase or
19 construction?

20 A. Yes.

21 Q. And if we could zoom in on the top key up in the left-hand
22 corner, maybe you can identify for us what the individual
23 colors are and explain what you mean by these various
24 categories.

25 A. Blue in general is equipment that existed during the UGI

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1 period, the 1910 to 1926. With a dark blue crosshatched it
2 was in my opinion operated by UGI. With a light blue
3 crosshatched it was installed by UGI and operated by UGI. And
4 with a red crosshatch it was in existence already, but UGI
5 modified it during their tenure.

6 MR. FELMLY: And if we could now go to the drawing
7 itself, Denise.

8 Q. And so, for example, let's take the relief holder which
9 you've been discussing and which is located down in this area
10 of the site there, you had testified earlier that was a
11 structure that was built in the 1910 rebuilding of the plant.
12 You categorized that in which of your categories?

13 A. UGI installed and operated.

14 Q. And the generator house, that is a little bit to the right
15 and up from the relief holder, is also seemingly crosshatched
16 in the same color. Is that a structure that UGI was part of
17 the rebuild of the plant in 1910 and we're attributing to UGI?

18 A. Yes.

19 Q. And I think I understood you to say the generator had some
20 particular relationship to carbureted water gas. Can you
21 explain that again so we understand why it's part of the new
22 process?

23 A. The generator house was the building that contained the
24 carbureted water gas.

25 Q. Now, the gas storage holder, which is over here on the

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1 left side of the plan right where you've circled it, what are
2 you categorizing that as in terms of UGI involvement?

3 A. They operated it. It was built originally in, I think
4 around 1860. It was rebuilt in 1893, so that was obviously
5 before 1910. And it was operated throughout the entire
6 periods of -- during the 1910 to 1926 period.

7 Q. So is that the city holder?

8 A. Yes.

9 Q. And that's where the gas is stored before it gets
10 distributed throughout the City of Charleston?

11 A. That's right.

12 Q. And that was there for their entire tenure?

13 A. Right.

14 Q. The retort house seems to be shaded with something that
15 indicates it was UGI modified. What was the circumstance of
16 that?

17 A. Prior to 1910, the only form of gas manufacture was coal
18 gas, and it was made in the retort house. When the carbureted
19 water gas system was put in, the retort house was abandoned.
20 But in 1917, I think it was, there was an extra demand for
21 gas, a cold winter, I think it was, and they fired up the
22 retort house again. And in doing that, UGI improved the
23 construction of the retorts to be able to make coal gas as a
24 supplement to the carbureted water gas.

25 Q. There are two tar tanks labeled over in this area where I

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1 put in the green dot at, next to the what's called the bus
2 lane. It's a little hard to see one of them, but are they
3 colored in a way that can tell us what the role you're
4 attributing to UGI is?

5 A. UGI installed and operated those.

6 Q. The structure that is over here in this portion of the
7 drawing, the so-called steam power plant, what was that?

8 A. That was a steam plant for -- basically for electric
9 generation, I believe, but there was a deal with the gas plant
10 to buy the steam or use the steam for the gas manufacturing
11 process.

12 So UGI built the steam plant starting in 1910, and the gas
13 plant used the steam, as well as that steam plant being used
14 for other purposes.

15 Q. Was the steam plant a part of the gas plant per se?

16 A. No.

17 Q. But it drew energy from it?

18 A. The gas plant drew steam from it, yes.

19 MR. FELMLY: Let me ask you, Denise, to put up the
20 document that provides backup for this.

21 Q. This document is entitled UGI control information sources,
22 and it's obviously very small reading, but we have provided
23 the Court a larger full-size map. But conceptually and for
24 purposes of understanding how you have gone about this
25 process, what does this show?

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1 A. This provides the information sources that we use to
2 devise the purple and blue shading. Every box points to a --
3 an area or building or unit operation, and inside that box is
4 a listing of all the historical data information we have
5 relating to that piece of equipment.

6 And what I've done in here within the boxes, is I've
7 shaded in blue any information that we have during that period
8 1910 to 1920. So --

9 Q. 1910 --

10 A. 1926, I'm sorry. So any purple item here -- well, all the
11 purple items, I guess, are MGP. No, they're not. The purple
12 items are the UGI-related things, and then if you follow the
13 arrow to the box, the blue part of the box is the information
14 backup that we have for knowing whatever we know about that
15 time period.

16 Q. And in terms of the data that you've looked at, you
17 mentioned that it includes things like minutes and documents
18 of UGI. Have you also looked for information in the historic
19 record available in the community?

20 A. In some cases we have. We didn't have a lot of
21 information from community records, but we have some newspaper
22 articles, for example, and some histories of the plant, and
23 wherever we could get information from that source, we did.

24 Basically this represents all the sources of information
25 we could get our hands on. The bulk of the information are

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1 either UGI records or CCR&L records.

2 THE COURT: What's the number of that exhibit?

3 MR. FELMLY: That is Exhibit 78, it's a portion of
4 Exhibit 78, and I was going to -- I've used two documents from
5 it. I actually -- the document that I had moved earlier this
6 morning to have admitted and we got into the issue of the
7 abstract. I would move the entirety of Exhibit 78. I've
8 removed out the -- I guess there wasn't a summary sheet on
9 this one. But I've gone through many of the exhibits in here
10 and the photos and the like, so I would move Exhibit 78 into
11 evidence at this time.

12 THE COURT: Any objection?

13 MR. VARON: Yes, Your Honor, we object to the entire
14 characterization of it. We don't think that the -- hasn't
15 explained what the basis is for saying that UGI installed or
16 operated any of this equipment, and we will explore on cross
17 and otherwise, each source document and show that it has
18 nothing to do with UGI, that it's the subsidiary that is
19 engaged in this activity.

20 THE COURT: Yes, sir?

21 MR. FELMLY: Let me just respond to that.

22 THE COURT: Sure.

23 MR. FELMLY: The entire contention in the case is
24 that CCR&L was used by UGI and created as part of a both abuse
25 of the corporate forum, but also as a controlled entity, and

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1 it was UGI there. It may well be that the documentation said
2 that, but going to -- if we frame it in terms of CCR&L during
3 that period, and I mean, I don't want to have Dr. Shrifrin try
4 to decide the ultimate question about whether or not as a
5 legal proposition UGI is the entity that should be
6 responsible. But we're -- what we're saying is that
7 subsidiary on these papers indicated that it was buying it.
8 But it was during the period of time when UGI was there. And
9 so in order to make the case that shows the relationship, I
10 really have to show, I believe, to you, the kind of periods of
11 time when these activities occurred. So I don't mind it
12 being asked or said in terms of as alleged by the plaintiff.
13 I'm not trying to --

14 THE COURT: Well, ultimately if it's important, and I
15 think it will be important, to determine what installation UGI
16 made, what operation they did, what they owned, then I'll have
17 to look at these documents and make that decision. I have
18 seen nothing about this witness' expertise that would give him
19 a better ability to look at these documents and draw the
20 conclusions that he's made.

21 Now, I haven't studied them in detail. I may apologize to
22 him and tell him I don't have any chance of reaching the
23 conclusions that he's reached. But it seems to me now that
24 what he's done is lay out for the Court a roadmap, if you
25 please, of how to arrive at these conclusions that the

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1 plaintiff contends are important in this case. And if we
2 determine that they are, which I think we will, then we have
3 to follow that roadmap, and conclude ourselves independently
4 whether or not his conclusions are supported, and whether or
5 not we can adopt those conclusions.

6 Now, it may be that in that process, as I become more
7 familiar with this exhibit and the appendages thereto, that
8 then I'll say, well, I'm going to yield to the expert and I'm
9 going to take his opinion because I think that it is a field,
10 and I look at it more closely, where he's qualified and better
11 qualified than I am to reach those decisions. But I can't get
12 there right now. All I can do right now is I'm going to
13 overrule your objection and I'm going to take it for whatever
14 it's worth.

15 MR. FELMLY: So it is marked.

16 THE COURT: Marked in evidence.

17 (Plaintiff's Exhibit 78 received.)

18 THE COURT: There's just no way I can digest all that
19 in ten minutes, and I'm not going to take your time to digest
20 it. Because I don't want you to know how long it takes me.
21 Might take me a week.

22 MR. VARON: I think it might take awhile, Your Honor.

23 MR. FELMLY: If I might just have a second, Your
24 Honor, to clarify one thing.

25 Your Honor, what I'm doing, in light of the Court's

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1 ruling, is pulling out the full-size version of this under the
2 proposition that I think it might be easier for the Court,
3 this is exact -- this is the identical document that I was
4 just displaying on the video screen.

5 THE COURT: I'm hoping you've got something bigger
6 than that, because I can't read that.

7 MR. FELMLY: So I'm thinking that -- then really, I
8 will promise you this is not only redundant, it's 100 percent
9 redundant, it's an exact copy, but a lot easier to work with.
10 And that document is Exhibit 98, the UGI control of MGP
11 equipment, and it's the document we used to create the
12 depiction that was part of the video presentation. So on the
13 same basis I would ask that this larger copy be offered for
14 the benefit of the Court's review.

15 MR. VARON: Same objection, but --

16 THE COURT: Overruled.

17 (Plaintiff's Exhibit 98 received.)

18 MR. FELMLY: Denise, are you able to bring up Exhibit
19 No. 100, please.

20 BY MR. FELMLY:

21 Q. Dr. Shrifrin, I'm bringing up on the screen Exhibit 100,
22 and I'm going to ask Denise to bring up the top fifth of the
23 page or so with the title so that we can see what it is, and
24 then ask you to identify what the purpose of this is.

25 Obviously we're bringing up a portion of the page. This

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1 Exhibit 100 is what?

2 A. This is a table out of the report that I wrote which
3 summarizes all of the equipment installation and modification
4 performed at the Charleston plant during UGI's tenure.

5 Q. And how does this table or the information on here relate
6 to the drawing that contained, I guess a visual or drawn
7 depiction of information about equipment and how it was
8 installed and when it was installed?

9 A. The information on the left -- on the middle column which
10 is next to the years, is -- should be the same as the
11 information on the map that had the equipment.

12 In addition, we've noted where there are director
13 authorizations for this on the right-hand side of this table.

14 Q. So is this, in effect, a source document or a tab -- a
15 table that would track and be of assistance in the
16 interpretation of the diagram with the various indications of
17 sources that we just admitted into evidence?

18 A. Yes, this is a little more elaboration on the content of
19 those sources. It would be good to go to the sources
20 themselves as well.

21 Q. And is this the product of the research and the
22 information that you brought forth in your report and as a
23 part of your historic analysis and review of the plant?

24 A. Yes.

25 MR. FELMLY: Your Honor, I'd also offer this as a

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1 further aid to the understanding of the visual exhibit, and it
2 would be the most convenient summary in sort of a narrative or
3 tabular form. It's Exhibit No. 100, and on the same basis I
4 would offer it for the aid of the Court as a full exhibit.

5 THE COURT: Now, where did you get this information
6 from?

7 A. Prior to writing my report, which was written in, I think
8 about a year ago, so we did research perhaps for two months
9 prior to that.

10 THE COURT: These are corporate minutes and that type
11 thing?

12 A. Corporate minutes, some newspaper articles, historical
13 documents.

14 THE COURT: Do you show here what the sources are?

15 A. Yes, we list the Bates numbers for the information.

16 THE COURT: Okay. The SCANA 000736, that's a
17 document the defendants know about?

18 A. That's right.

19 THE COURT: Okay. Any objection?

20 MR. VARON: No, Your Honor.

21 (Plaintiff's Exhibit 100 received.)

22 BY MR. FELMLY:

23 Q. One other identical housekeeping -- strike that, I don't
24 need to do this one.

25 In addition to examining the equipment and the pieces of

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1 the plants --

2 THE COURT: Let me interrupt you just a minute. If I
3 conclude that this testimony is outside of this witness'
4 expertise, then the question arises whether or not what value
5 the testimony has, and where it fits within our rules of
6 evidence. And that's been something that's been running
7 through my head since we first started talking about this.

8 And it seems to me that pursuant to Federal Rule of
9 Evidence 1006, which has to do with summaries, that this falls
10 there. I'm sorry, 1006. Did I say six or seven?

11 MR. FELMLY: It is six, Your Honor.

12 THE COURT: It says, "The contents of voluminous
13 writings, recordings or photographs which cannot conveniently
14 be examined in court may be presented in the form of a chart,
15 summary or calculation. The originals or duplicates shall be
16 made available for examination or copying or both by other
17 parties at reasonable time and place. The Court may order
18 that they are produced in court."

19 So it seems to me that this evidence, if it's nonexpert,
20 then it falls within that category, and it can come into
21 evidence under Rule 1006 as lay -- well, I don't want to call
22 it lay, because usually an expert prepares summaries -- but as
23 summaries of very voluminous complicated data, that it's
24 difficult for the Court to review, and these summaries help me
25 do that.

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1 So I think in any event, it comes in either as under
2 Rule 703, something experts in his field reasonably rely upon,
3 or under Rule 1006 as a summary. And just occurred to me as I
4 was thinking through this situation that that may be
5 important, and I want to put it in the record.

6 You may proceed.

7 MR. FELMLY: Thank you. I also want to make it
8 clear, although I'm sure it's obvious to the Court, all of
9 this information has been extensively exchanged through the
10 parties.

11 THE COURT: The underlying documents are available.

12 MR. FELMLY: Underlying documents in discovery, then
13 the exhibits have been, we've exchanged them, and again, as I
14 said this morning, we actually came to an agreement with
15 respect to them coming in. And I understand the Court's
16 concern about the stipulation we had. But I agree and pleased
17 with that ruling. We intend them as a summary, Your Honor.

18 BY MR. FELMLY:

19 Q. Dr. Shrifrin, I want to turn our attention now to the site
20 environmental conditions in the area that we've been talking
21 about in regard to the plant. And in particular, want to
22 address the Plaintiff's Exhibit 80, which deals with the site
23 conditions at the site. And have you gone through and done --
24 you have to go back from that. Take it down for a second,
25 because I want to lay more foundation before I bring it up.

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1 In terms of the process of trying to examine where the tar
2 is and how it may relate to the structures that you portrayed
3 in the exhibits that we've just gone through with the judge,
4 can you tell the Court what the process you've undertaken in
5 order to form an understanding of the nature of the
6 contamination, where it is and how it may relate to the
7 structures that are part of the plant in the 1910 to 1926
8 period?

9 A. In a nutshell, we've reviewed -- I've reviewed all of the
10 environmental information. Let me break that down into what
11 that is.

12 There's several different types of information. One are
13 the studies reports. There was a preliminary investigation,
14 there were fingerprinting reports, chemical fingerprinting
15 reports, there was a remedial investigation study, there was a
16 baseline risk assessment. There were a number of documents
17 that I would call studies reports. I reviewed all of those.

18 And I reviewed the underlying information from those,
19 which is a very important fact that when environmental samples
20 are collected, particularly subsurface samples. Corresponding
21 with those samples usually is some kind of a field log of what
22 the field person saw as they installed the boring or well or a
23 trench or something like that. There's a lot of information
24 that can be gained from that. We studied those very
25 carefully. Because it doesn't necessarily show up in the

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1 laboratory result as much as we would like. So that's why you
2 see notations of NAPL or tar or oil or sheeting or all of
3 these other things.

4 So we studied the reports and we studied the underlying
5 information that stand behind the reports.

6 In addition to that, we reviewed all of the regulatory
7 information related to the environmental issues. So that
8 would be the two rods, the explanation of significant
9 differences, some of the correspondence between the gas
10 company and the agencies. Those not only display the
11 environmental conditions, but they also describe the plans for
12 the remediation and the responses.

13 Q. Now -- I'm sorry, I cut you off.

14 A. Then we took all that information, and to some degree
15 recompiled it in our own way so we could manage the
16 information ourselves and make views of the information in
17 ways that are helpful to us. So we took data that were
18 collected by others and reconfigured it into information that
19 helps us interpret the data better.

20 Q. Let me step back one small step, I hope. In general on a
21 site like this where there's examinations of groundwater and
22 there's examinations of whether there's contaminants like NAPL
23 in the subsurface, what are the principal ways in which
24 investigators obtain data, what are the sampling or drilling
25 or what are the processes that take place, and then I'm going

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1 to ask you about the magnitude of that in connection with this
2 site. But first of all, how is this done?

3 A. Well, of course you start with a blank slate, you're
4 standing on the ground and you're wondering what went on in
5 history when you don't see anything in front of you that used
6 to exist.

7 So generally and EPA prescribes this, you do what's called
8 a preliminary investigation where you look up historical
9 records to the extent you can, to understand the historical
10 operations of the plant.

11 That then gives you a guide to where to install samples.
12 And having some information about what happened at this parcel
13 of land in history, you collect samples. And there are
14 several kinds of samples. The fundamental samples are soil
15 borings, groundwater samples and excavation trenches. Which
16 can be a combination of visual observations as well as soil
17 samples. Or water samples.

18 So typically you design where you're going to put these
19 holes in the ground, and there are machines that will drill
20 the borings where you pound sleeves into the ground, you pull
21 them out and open them up and you see cores of soil that
22 presumably are exactly like they were in ground.

23 You make those observations, you write those into logs,
24 and those are the boring logs or the core logs that you
25 mentioned before. And in some cases you take scoops of those

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1 soils, put it in a bottle, send it to a laboratory and tell
2 them what analytical fractions you want analyzed. And at a
3 site like this you might do what's called a full priority
4 pollutant scan, which means trace metals, semi-volatile
5 organics, organics and possibly PCB pesticides, although that
6 might be unusual at a site like this.

7 Sometimes you take samples at multiple depths. These
8 problems are very three-dimensional, extremely three-
9 dimensional. So you might drill a hole in the ground and take
10 a sample at, say a two- to four-foot interval, and then take
11 another sample at a ten- to 12-foot interval, and even another
12 sample at a deeper interval. Sometimes the way you decide on
13 those intervals is from having done some preliminary studies
14 so that you understand the stratigraphy of the subsurface.
15 Where's the clay layer, where are the sandy layers, where's
16 the peaty layers and things like that. So you use some
17 information about the site geology and stratigraphy to guide
18 your sampling depth.

19 Some of the holes that you drill, you complete as wells.
20 And a well is nothing more than a plastic or steel tube, and
21 at the very bottom of it usually a five-foot length of it or
22 ten-foot length of it, it's slotted, very thin slots which
23 allows water to come in, and there's either a pump in that
24 well or you put another tube inside that well to collect a
25 water sample.

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1 So you collect groundwater samples and you send those to
2 the labs for the same analytical fractions.

3 Now, at a site like this, every hole you put in the
4 ground, every trench you dig, every groundwater well you put
5 in the ground, you're also looking for NAPL. And NAPL has its
6 own characteristics. So, for example, if it's a groundwater
7 well, that NAPL is going to want to sink to the bottom of the
8 well. So you have to be sure you're sampling at the very
9 bottom of the well or with a special device. And there are
10 special devices specifically to look for NAPL.

11 At any rate, at the end, you've done one round of sampling
12 where you've collected some soil borings, possibly some
13 groundwater samples, possibly some test trenches where you've
14 taken samples and made visual observations.

15 You compile all that information, and that either gives
16 you a full picture of the site, or it gives you enough of a
17 picture of a site to understand where you have to collect more
18 data to fill data gaps.

19 Q. Have you made an extensive intensive review of all of that
20 data that comes out of that process that you just described in
21 a general way for the Charleston MGP site?

22 A. Yes.

23 MR. FELMLY: And, Denise, if you could bring up the
24 first slide in Exhibit 80. Second slide.

25 Q. This particular drawing is -- I gather is a drawing that

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1 you and your staff prepared, is that correct?

2 A. That's right.

3 Q. And this is called all sampling locations. And what I'd
4 like to do is to first ask you what all the dots are, not in
5 terms of the color, because I know they're differentiated, but
6 just in general terms there are a series of dots all over this
7 area near the site. What are these?

8 A. Each dot is a sampling location. And that sample location
9 may be a groundwater sample, a soil sample or soil samples at
10 multiple depths.

11 Q. And with regard to the layout of the structures that are
12 present here, do these conform, both in terms of color and
13 location, to your -- the drawings that you were discussing a
14 little while ago which depicted the structures that you were
15 attributing to UGI during the relevant period?

16 A. Yes, the structures are noted here, as well as the
17 sampling locations.

18 MR. FELMLY: Now, Denise, if you could enlarge the
19 top half of it so that we pick up both the table as well as
20 the -- that's fine.

21 Q. If you could, Dr. Shrifrin, and in relation to this, let
22 me first ask you, as environmental superfund sites go, and I'm
23 sure they vary tremendously, is this an intensively studied or
24 examined site?

25 A. That is a well-studied site. This site has a lot of

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1 samples compared to others that I've worked on. I mean, I've
2 worked on some that have as many, but I've worked on some that
3 have much fewer, too.

4 Q. And at this point if you could orient us and the Court for
5 how the table works and how the various dots should be
6 understood to be reflected in relation to the key or the
7 database that you've provided on the drawing.

8 A. This drawing first shows all the sampling locations as
9 dots, but then we added information, what was in those dots,
10 what was in those sampling locations.

11 Dots that are colored red have DNAPL in the sample
12 location. DNAPL being tar.

13 THE COURT: I don't see any red dots.

14 A. Maybe there's different colors on the different screens.

15 THE COURT: Is that the top color on the left there,
16 is that red?

17 A. This one right here is red.

18 THE COURT: Okay.

19 MR. FELMLY: Let me ask it here, because it's brown
20 on my screen, I'm not sure --

21 THE COURT: Brown on my screen, too.

22 A. Because brown means something else.

23 MR. VARON: It's red-brown.

24 A. There's red, there's brown and there's green. Hopefully
25 on the screens they're distinguishable. The red is meant to

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1 be DNAPL.

2 THE COURT: I think we have brown, green and dark
3 brown.

4 A. So the light brown would be the red. So the light brown
5 or red is meant to denote DNAPL, which in this case is tar.
6 And there are two shades of each of these colors. The darker
7 shade means there's enough there to be mobile, dripping. And
8 the lighter means that all that was observed in our
9 interpretation of the logs is what we call residual, which is
10 just enough to be stuck to the soil but not moveable, not
11 dripping.

12 So the green is the LNAPL, which would be an oil floating
13 on the water table. And you can see there are some, but there
14 are very few of those.

15 Q. Let me just see if we can find, is there --

16 A. These two right here are green.

17 MR. FELMLY: So, Denise, if you could zoom that up
18 just so we could see that area a little bit better right in
19 there.

20 THE COURT: Do I really need to know that?

21 MR. FELMLY: You don't. Do what?

22 THE COURT: I said do I really need to know that?

23 MR. FELMLY: Yeah, that's green. I'm not sure --

24 Again, we'll try to provide something that's easily read.

25 BY MR. FELMLY:

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1 Q. All right. Keep going, what -- talking about a --

2 A. There's brown here, which is NAPL, which all that means to
3 us is that when you review the boring logs, they didn't give
4 enough information to tell whether it's an LNAPL or a DNAPL.
5 So to keep it honest, we just say it's NAPL. In this site
6 it's most likely tar.

7 Now, the thing -- forgetting about the red, green and blue
8 and brown, the thing to really note about this diagram is how
9 many colored dots there are. And what that means is that
10 there's a lot of tar at this site.

11 The final thing I want to point out on this is these three
12 little blue arrows are the direction of groundwater flow. So
13 this shows you how towards the east groundwater is flowing
14 towards the river, but towards the south it's flowing down
15 towards the Calihan arch.

16 Q. Calhoun?

17 A. Calhoun arch.

18 Q. Are there sites here where there are essentially no hits?
19 In other words, are there --

20 A. Well, there's no tar over in this southern area, that's
21 been observed so far with the sampling.

22 Q. Okay.

23 A. So the tar, the tar really is concentrated at the gas
24 plant and the steam plant, and then there's been some
25 migration over here into the -- what's now called Liberty

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1 Park.

2 THE COURT: Right at the bottom of that circle, if
3 I'm right, that's Calhoun Street.

4 A. This is Calhoun street. That's right.

5 THE COURT: And you say there's some storm sewer
6 right down the middle there?

7 A. That's right. There was a --

8 THE COURT: Would that deter the flow of the tar?

9 A. It could. It could intercept the tar, depending on the --

10 THE COURT: Seems to me like --

11 A. -- the depth of the pipe. I don't really remember how
12 deep that pipe was, but I've seen that happen at sites.

13 BY MR. FELMLY:

14 Q. Let me ask you about that sewer.

15 THE COURT: I'm going to recess. I promised you to
16 recess a little early today, and I apologize for depriving
17 y'all of another hour of court, but I've got somewhere I want
18 to go. Since we're going to be here for three weeks, if it
19 was one week I'd switch my schedule around, but since we're
20 going to be here for that period of time, I'm going to recess
21 early.

22 So we'll pick back up in the morning at 10:00 o'clock and
23 run a normal day tomorrow. Have a nice evening, I'll see you
24 back. And try to fix those exhibits up and give them to the
25 clerk in the morning.

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1 MR. FELMLY: I will.

2

3 (Court adjourned at 4:00 o'clock p.m.)

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REPORTER'S CERTIFICATION

I, Debra L. Potocki, RMR, RDR, CRR, Official Court Reporter for the United States District Court for the District of South Carolina, hereby certify that the foregoing is a true and correct transcript of the stenographically recorded above proceedings.

Debra L. Potocki, RMR, RDR, CRR